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THE UNIT PLAN VERSUS THE TEXTBOOK PLAN OF TEACHING ARITHMETIC
TO SEVENTH AND EIGHTH GRADE PUPILS

being

A thesis presented to the Graduate Faculty
of the Fort Hays Kansas State College in
partial fulfillment of the requirements for
the Degree of Master of Science

by

Arthur P. Harvey, B. S.

University of Kansas

Approved

Robert T. McGrath
Major Professor

Date

July 26, 1940

W. Albertson
Chairman, Graduate Council

To

Dr. Robert T. McGrath, Director of Education,
Fort Hays Kansas State College, I owe my debt
for freely given time and kindly advice in
formulating an experimental procedure for
this study.

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CHAPTER I

INTRODUCTION

1. The Problem

The present day trends in education seem to indicate the desirability of its becoming more and more a socialized education. This trend will no doubt have a more significant bearing on some subjects or studies in the school curriculum than on other subjects. The Kansas public elementary schools have recently adopted a Unit Program in School Studies, which includes history, civics, geography, science, and hygiene in an attempt to contribute better to the socialized idea.

This Unit Program, however, does not make direct provision for English, spelling, arithmetic, and penmanship. Naturally, perhaps, comes the question to many teachers of why these subjects, too, were not included in the Unit Program for the State. Perhaps they do not lend themselves readily to the Unit Plan of teaching, or it may be that because of the nature of their content greater achievement can be had by following the textbook plan of teaching.

Questions of this type and others have kindled the imagination and thinking of the writer until he finally chose

the following specific problem for investigation and study:
"Which instructional plan of material of teaching arithmetic to seventh and eighth grade pupils is the better--the unit plan or the textbook plan?"

2. The Unit Plan and the Textbook Plan Defined

The definition of the unit plan as given by Billett¹ seems to be an acceptable one for our purpose. It is this:

The unit consists of suggested or related activities and experiences planned by the teacher to enable the pupil to master the unit, that is, to acquire the desired concept, attitude, appreciation, knowledge, or skill.

The unit assignment is found generally to consist of some of the following factors: (a) Directions for study; (b) references for reading and study; (c) a list of supplementary projects; (d) an outline of minimum essentials; and, (e) a tentative time allotment. It might be further characterized by including one or more of the following: Approach paragraphs to stimulate interest and curiosity; statement of the objectives of the unit; short lists of basic questions; topics for discussion, dramatization, or demonstration; notice of special difficulties to be encountered; list of materials and apparatus needed; assignment of individual reports or investigations; elective work; references on correlation with

1. Billett, Roy O., Plans Characterized by the Unit Assignment. (In The School Review, vol. 40, p. 653. Nov., 1932).

other subjects; and test on the assignment.

Now as to the textbook plan, it is generally understood to consist chiefly in the performing of computations and drills that are necessary to the solution of problems or examples relative to a certain subject which has been set by a textbook or a course of study. In the narrowest sense, it may mean the studying of material in a textbook page by page and in the order as printed in the book.

3. Review of Previous Studies

The National Survey of Secondary Education indicates that, of all the plans to provide for individual differences, the unit assignment is the most widely distributed and most commonly used. This survey indicates that the unit assignment is a prominent characteristic of the plans, techniques, or methods commonly referred to in educational writings as the problem method, differentiated assignment, the laboratory plan, long-unit assignments, the contract plan, the project method, individual instruction, the Morrison Plan, the Dalton Plan, the Modified Dalton Plan, and the Winnetka technique. However, "..... irrespective of what the originators of these procedures may contend as to differences represented, the procedures, as actually carried on in the

schools, are practically identical."³

A large number of experimental studies have been carried on using the textbook method as a control method of teaching and one or a combination of these procedures as the experimental method of teaching. Not many investigators described the textbook method in detail as they used it, although it might be fair to assume that it did represent a high quality of teaching. Eilberg⁴ experimented with the Dalton plan for fifteen months in two tenth grade geometry classes involving two matched groups of thirty students each. The control group was taught by the textbook method. He found that the average student of the Dalton group accomplished more than did the average student taught by the textbook method, but that the better and poorer students were not affected by the methods used. He found also that the Dalton group required more of the teacher's time than did the textbook group.

C. N. Stokes,⁵ of the University High School, University

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3. Editorial Comment, The Unit Study in Actual Practice. (In The School Review, vol. 40, pp. 321-323. May, 1932).
 4. Monroe, Walter S. and Marks, Arlyn, General Methods of Teaching Evaluated: Results of Research. (In Educational Administration and Supervision, vol. 24, p. 581. Nov., 1938). Quoting Eilberg, A., "The Dalton Plan Versus the Recitation Method in the Teaching of Plane Geometry." Doctor's Thesis, Temple University, 1931.
 5. Stokes, C. N., A Report of One Technique of Individualized Instruction in Ninth-Year Algebra. (In School Science and Mathematics, vol. 27, p. 129. Feb., 1927).

of Minnesota, working with a technique based fundamentally on the principles of the Winnetka plan and also some of the principles of the unit type of supervised study in operation at the University of Chicago Laboratory Schools, experimented with two hundred twelve students in ninth-grade algebra for a period of two and one-half years. He found the students in the experimental group covered an amount of work in seven and one-half months which was comparable to the amount done in a traditional textbook class in nine months. However, he reports that the quality of work as measured by achievement tests was the same for both classes, except that the poorer students of the experimental group did better work than the poorer students of the textbook group.

6

Russell and Long studied two methods of teaching two different groups of twenty-one pupils each in seventh-grade arithmetic. One of these groups was taught by the Winnetka plan, while the other group was taught by the recitation or textbook plan. They report that the Winnetka plan proved to be superior to the textbook plan when subject-matter achievement was considered as the basis for their judgment.

If we prefer to think of our experimental groups in

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6. Russell, F. O. and Long, I. E., A Comparison of Two Methods of Instruction in Seventh-Grade Mathematics. University of Kansas, Bulletin of Education, vol. 11, No. 6, pp. 21-24. Lawrence: University of Kansas, 1929.

terms of the Project Method, then perhaps Collings'⁷ work with this method would be outstanding. His experimental results tended to favor the experimental groups, and in a later work of 1933, he attempts to further prove the merits of the project method. From the seventh-, eighth-, and ninth-grades of two different schools he selected sixty-four matched pairs of students for his experiment. The project method was being used as the method of teaching in one of these schools, and a high grade of traditional textbook-method of teaching was being used in the other school. Collings measured the achievement of these two groups in all the school subjects with standardized tests and found that with few exceptions the mean scores of the project groups were significantly⁸ higher than the mean scores of the other group. It might be well to note that this was not a controlled experiment, and many unmeasurable factors might have been involved in the study.

Experiments relative to the effectiveness of the Morrison plan might indicate that it is not especially superior to the textbook method with which it has been compared.

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7. Collings, Ellsworth, An Experiment with the Project Curriculum. New York, The Macmillan Co., 1923. 346pp.
 8. Monroe, Walter S. and Marks, Arlyn, General Methods of Teaching evaluated: Results of Research. (In Educational Administration and Supervision, vol. 24, p. 585. Nov., 1938).

Funk employed the Morrison plan of teaching and the textbook or recitation method of teaching in a twelfth-grade "Problems of Democracy" class for one year. He set up four equivalent groups of about twenty-two students each for his experiment and at the end of the year concluded that there was no difference in the subject-matter achievement that could be assigned to the methods used in teaching, but that the Morrison plan pupils did more reading than the textbook plan pupils. His personal opinion indicated that the pupils liked to study under the Morrison plan.

Sheldon used the Morrison plan and the recitation plan in his ninth- and tenth-grade classes in general science. Each method was tried in the two classes for a period of time of one semester. His conclusion, based on subject-matter tests, supported the belief that neither method of teaching was superior.

10

Douglass and Pederson reported a controlled experiment in which they compared a modified Morrison plan with a study-recitation or textbook plan in teaching American history.

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9. Funk, M. N., A Comparative Study of the Results Obtained by the Method of Mastery Technique and the Method of Daily Recitation and Assignment. (In The School Review, vol. 36, pp. 338-345. May, 1928).
 10. Shelton, A. L., An Experimental Study of the Daily Recitation Versus the Unit Plan. (In The School Review, vol. 38, pp. 694-699. Nov., 1930).
 11. Douglass, H. R. and Pederson, K. L., An Experimental Evaluation of a Unit Procedure in Teaching American History. (In The School Review, vol. 44, pp. 362-371. May, 1936).

The experimental procedure was offered for about ten weeks in each of two semesters in eight sections of high school American history. The experimenters concluded that the unit plan "..... is likely to yield results slightly superior to those obtained by a study recitation plan of supervised study."

12

Bruce used a modified application of the Morrison idea in a high school chemistry class for one year and compared the work of this group with that done by a group following the traditional procedure. He found that in factual memory, the Morrison group was inferior, but it was superior in its ability to apply what it had learned.

This review touches different grade levels and different subject-fields, and does not bring evidence with which to support conclusively the relative merits of general methods of teaching. As a whole, there seems to be a tendency to support that method of teaching which recognizes individual differences and emphasizes student responsibility as being more effective than the method which does not take these factors into consideration.

It might be altogether proper to call attention to the fact that practically all instructional patterns make a complex

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12. Bruce, G. V., An Attempt to Vitalize Chemistry Teaching in the High School Through a Modified Form of the Unit-Assignment Technique. (In Science Education, vol. 16, pp. 209; 392-403. Feb. and Oct., 1932).

experimental problem. In any teaching method or pattern a teacher may make certain variations which one might expect would affect the effectiveness of the instruction. For example, there might be variations in assignments and the manner of making it. There might be subjective factors entering into the teacher's evaluation of the pupils' responses. Also, the measurement of outcomes might be rightfully questioned. In the studies reviewed here, the outcomes of the experiments were measured chiefly in subject-matter achievement, that is, information and skills. Since the proponents of some of the methods claim that there are other outcomes involved in the use of their methods, it is apparent that the question of relative merit should not be considered answered until these other outcomes have been measured.

These experiments did not completely provide for the control of teacher-zeal, teaching-skill, and teacher-enthusiasm. Perhaps, too, the length of time given to some of the studies was too short for making valid claims for the method under study. With these limitations in mind, and the acknowledged need for more adequate means for measuring the outcomes of instruction, we should hesitate to assign any great superiority to any particular one method of instructing.

4. Procedure

The experimenter in the problem now under discussion used the parallel-group and the rotation-group technique in his investigation. To set up the two divisions in the seventh and eighth grades so that each grade would have a control and an experimental group, the experimenter carried out an initial testing program. This program consisted of finding and recording the pupils' chronological age, mental age, intelligence quotient, general achievement score, and their arithmetic fundamentals score. This data was weighted so that a composite score could be used in pairing individuals for the experimental group and the control group.

After using these composite scores for equating the groups, the experiment proceeded with fourteen weeks of instruction, alternately studied four units of work of an average time of three and one-half weeks each. Then the control groups, of the groups studying under the textbook plan of instruction, alternately studied the same content material from the textbook for the same length of time as the experimental groups. Each of the groups met daily in thirty minute class periods and was instructed by the same teacher, the experimenter. Testing was done at the completion of each unit and at the conclusion of the experiment. The same tests were used in both the control and the experimental groups and were scored by the same method.

The next procedure was to analyze and to study the recorded data for conclusions as to the relative merit of the one plan of arithmetic instruction over the other plan; to summarize the findings of this study; and to state implications and suggestions for further study.

5. Limitations

This investigation was carried out in the Macksville, Kansas, junior high school in the grades commonly referred to as seventh and eighth. The total time required for the investigation was fifteen weeks, which included one week for the initial testing program.

6. Acknowledgments

In formulating an experimental procedure for this study, the writer was kindly advised by Dr. Robert T. McGrath. Without his freely given time, it is doubted that the experimenter could have made the proper approach and study of this problem.

The experimenter is indebted also to his school board and to Mr. H. E. Zimmerman, Superintendent of the Macksville Public Schools, for his kind permission to carry on the investigation in the Macksville junior high school.

CHAPTER II

THE INITIAL TESTING PROGRAM

1. The Initial Tests

To obtain equal or parallel groups in ability in the seventh and eighth grade, a number of tests were given to the pupils of these grades, and from these test scores a composite score was derived. This derived score was used as an index in setting up parallel groups of matched individuals in each grade.

The composite score was derived from the following: (a) the chronological age from the pupil's school enrollment card; (b) the mental age from the Terman Group Test of Mental Ability for grades seven to twelve, Form A; (c) general achievement from the New Stanford Achievement Test, Advanced Examination Form W, for grades four to nine; (d) arithmetic fundamentals from the Schorling-Clark-Potter Arithmetic Test, Form A, Revised; and the intelligence quotient from computations using the scores made on the Terman Group Test of Mental Ability, Form A.

For the data of the initial testing, see Table I for the Seventh grade and Table II for the Eighth grade on pages 32 and 33 in the appendix.

2. The Weighting of the Initial Tests

Since the composite scores of the individuals resulted from combining scores from different tests in which the size and kind of units differed, it was necessary to weigh the various test scores. The weighing in this experiment was done by the variability of test scores method, that is, the equalization of the spread or variability of the tests. Variability was computed by the short method of finding the average and the standard deviation or sigma as described by Henry E. Garrett in his Statistics in Psychology and Education.¹

For data and formulas used in computing the Average and Standard Deviation of general achievement, intelligence quotients, and arithmetic fundamentals for the seventh and eighth grades, see Tables III, IV, V, VI, VII, and VIII on pages 34 to 39 inclusive in the appendix.

To make all test scores have equal weight, each test sigma was multiplied by factors selected so as to make new sigmas and all of them equal. The sigma of the I. Q. scores of these pupils was accepted as the weight standard for all test scores and was valued as unity. Then, by using the new sigma as a multiplier of the individual's test score, the test score took on a new or weighted value. For the

1. Garrett, Henry E., Statistics in Psychology and Education. New York, Longmans, Green and Co., [1926]. 317p.

weighted test scores of the seventh and eighth grade pupils in arithmetic fundamentals and general achievement, see Tables IX and X on pages 40 and 41 in the appendix.

3. Composite Scores

After all scores were weighted, the composite score was formed for each individual by simply finding the sum of his weighted scores of intelligence quotient, arithmetic fundamentals, and general achievement. These weighted composite scores are found in Tables XI and XII on pages 42 and 43 in the appendix.

4. The Pairing of Individuals and Parallel Groups

In pairing individuals, the experimenter placed in two groups, A and B, pairs of pupils whose composite scores were most nearly the same. The variation in these individual scores was from zero through eight. However, in the total group scores, there was no difference between the groups in the seventh grade, and the difference in the total group scores in the eighth grade was four points. For individual pairing, parallel groups, and group totals, see Tables XIII and XIV on pages 44 and 45 in the appendix.

Because of the wide range of difference in the composite scores of two seventh grade pupils from each other's score and the scores of the other seventh grade pupils, the

experimenter ruled them from the experiment. This left a seventh grade group of only fourteen pupils in the experiment. In the eighth grade group of twenty pupils, two pupils were also ruled from the experiment because of the difficulty in making their scores match within the limits set by the experimenter.

The students of either group were not aware of the fact that they were paired with other students in another group.

CHAPTER III

THE EXPERIMENTAL FACTOR

1. The Units of Work

The experimental factor consisted of planned units of work in arithmetic equal in content to that of the textbook used and parallel to the state course of study. The length and content of the units of work were chiefly controlled by the amount and kind of work on the subject for study contained in the textbook. The various subjects for study were arbitrarily selected by the experimenter and they did not necessarily follow one after the other in a logical manner in the textbook used.

There were four units of work for each grade, and each unit required an average of three and one-half weeks of time for completion. The units planned for the seventh grade were as follows: Unit I, Percentage; Unit II, Some Applications of Percentage; Unit III, Some Geometrical Figures and Constructions; and Unit IV, Thrift - The Use and Care of Money. The eighth grade units were the following: Unit I, Banking; Unit II, Investments; Unit III, Fire and Life Insurance; and Unit IV, Surface Area and Volume of Some Geometric Solids. These units were constructed by the experimenter and are found with their tests on pages 46 to 102

inclusive in the appendix.

2. The Rotation Technique

The experimental factor was introduced into the experimental groups in both seventh and eighth grades at the same time, while the control groups in each grade studied the textbook material as outlined by the state course of study and the textbook. At the conclusion of each unit of work, the control groups in each grade became the experimental groups and the experimental groups became the control groups for the next unit of work. This alternating or rotation was carried on throughout the experiment.

3. Instruction Plan and Tests

Each of the four groups met in separate classes each day for thirty-minute class periods and each group was instructed by the same teacher. At the completion of each unit of work, the two groups of each grade met together to write on the test given which covered the subject or unit of work completed. All pupils cooperating in the experiment were given the same test for his grade, regardless of whether he was a member of the control group or a member of the experimental group.

All students in the two grades concerned were aware of the fact that an experiment was being performed and willingly cooperated. They were interested to the extent of inquiry

on occasions as to which group was doing the best work. The experimenter exercised due caution in disclosing any information to class members which might motivate one group to more study than might be exercised by the other group. Whatever oral instructions were given to the control groups were also repeated to the experimental groups.

CHAPTER IV

RESULTS OF THE EXPERIMENT

1. Eighth Grade Group

The total group scores of the experimental group--the unit plan pupils--exceeded the scores of the control group or textbook pupils on each of the four units. The greatest difference in the total group scores was 68 points in the first study unit on the subject of Banking. The smallest difference in total scores was nine points in the fourth study unit on the subject of Surface Area and Volume of Some Geometric Solids. In the study of Investments, the experimental group scored twelve points more than did the control group studying the same subject from the textbook. The second highest total score difference was made by the experimental group in study Unit III, on the subject of Fire and Life Insurance. Here the total difference in scores was 40 points. Tables XV, XVI, XVII, and XVIII on pages 103 to 106 inclusive in the appendix show the results of paired and total scores of the eighth grade pupils on each of the four study units of work in the experiment.

2. Seventh Grade Group

In the total group scores made in each of the four study units of work, the experimental group's scores were greater than the control group's scores. The highest total difference favoring the experimental group of pupils was 38 points made on the first study unit of work on the subject of Percentage. The smallest total difference favoring the experimental group was made on the subject of Some Applications of Percentage in study Unit II of the experiment. This difference was eleven points. The second greatest difference in total score points favoring the experimental group was 28 in the fourth unit of study on the subject of Thrift - The Use and Care of Money. In study Unit III, on the subject of Some Geometric Figures and Constructions, the experimental group's score was thirteen points greater than that of the control group's total score. For the results in paired scores and the total unit scores made by the seventh grade pupils on the four units of study in the experiment, see Tables XIX, XX, XXI, and XXII on pages 107 to 110 inclusive in the appendix.

3. Analysis of Results

A study of the tables of test results of the experiment for the seventh grade show that the experimental group or the group studying under the Unit Plan scored consistently higher than did the control group. This is true of total

group scores only, and does not hold for each individual in the experimental group.

The group-score difference of the various units are not, however, of uniform size in differences. This might indicate that some types of units or unit material lend themselves better to the unit plan of instruction than does the textbook plan of instruction; on the other hand, it might indicate that in subject units on which score differences between the unit plan and the textbook plan are very small, there is little to be gained in material achievement in using one plan in preference to the other one.

It should be noted that three pupils did consistently score above their partners throughout the experiment regardless of the particular group in which they were placed. This can be verified from the tables on pages 104 to 110 inclusive in the appendix.

Another fact to be noticed is that the total of the experimental group's score in excess of that made by the control group is a gain of total points for the group. That is, not all pupils studying under the unit plan did better work as measured by a test score than did their partners studying under the textbook plan. While some students' scores under the unit plan ranged above those made by the students studying under the textbook plan from two to fifteen points, one pupil in the first unit for the seventh

grade scored seven points below his partner studying under the textbook plan. In not one of the study units for either grade did the experimental or the control group succeed in scoring above the other group through all the individual scores.

The average individual gain for the Unit Plan pupils, however, in Unit I was six and two-thirds points above the average score for the control group in this unit. This fact may be verified from Table XIX, page 107 in the appendix. The average gain per pupil in the second unit of study was only one and five-sixths points in favor of the Unit Plan pupils (Table XX, p.108); and in Unit III, the gain per pupil studying Some Geometric Figures and Constructions under the Unit Plan was two and three-fifths points (Table XXI, p.109). This per pupil gain in the fourth unit for the seventh grade was four and two-thirds points. The necessary data to verify this can be found in Table XXII, page 110 in the appendix.

It should be noted, too, that in the unit of work, two pupils in Unit I for the seventh grade, and one pupil in Units II, III, and IV of the same grade have the outstanding high scores, which accounts for the chief difference in the total scores and affects the average score for all pupils in the experimental group favorably.

Much of what has been stated relative to the seventh grade thus far in this analysis is generally applicable to

the eighth grade group; that is, the average gains per pupil studying under the unit plan were small when compared with the average of the pupils studying under the textbook plan; two students scored consistently higher than their paired students and one student scored consistently lower than his partner in all groups in which they participated; and in no unit of work did all pupils of either group score above the pupils of the matched group.

In the eighth grade's first unit, the average gain per pupil under the unit plan was eight and one-half points above the average score for the pupils of the textbook plan. All but two pupils in this unit showed an advantage or positive score in favor of the unit plan (Table XV, p.103). The average per pupil gain in Unit II, however, shows only one and five-sevenths points advantage for the Unit Plan, but in Unit III, the per pupil average was six and one-half points in favor of the Unit Plan (Tables XVI and XVII, pp. 104 and 105). A study of Table XVIII, page 106 in the appendix, indicates that the test scores on Unit IV for the eighth grade gives the Unit Plan pupils a per pupil average above their textbook partners of one and four-fifths points.

It might be of some value to note that on the longest unit in both the seventh grade and the eighth grade, the unit plan of study groups made their highest average scores. The longest unit of study in the eighth grade was five weeks long, while two four-week units were the longest

units in the seventh grade.

A comparison between the arithmetic fundamentals test scores made by the pupils in the initial testing program of this experiment with the test scores made on the same test at the conclusion of the experiment indicates that the pupil's ability to do arithmetic fundamentals did not suffer for the lack of drill. In fact, there was a decided gain for the group in total scores for each grade, and most individuals did better on the second testing than they did on the initial testing. The comparative scores can be found in Table XXIII, page 111 in the appendix. Of course some gain could be expected as a result of student review of fundamentals as he worked on the various units in the experiment.

CHAPTER V

CONCLUSIONS

1. Limits in Source Data

The small number of pupils taking part in this experiment, the short length of time, and the small number of experimental factors used, limits the extent to which conclusions can be generalized.

It is apparent at once that factors other than achievement might have entered into the experiment; and that these factors were not measured, and which might show an advantage for one method of teaching over the other. Some of these unmeasured factors might be study habits, retention, interest, motivation, health, mind set, physical condition, home background or conditions, and perhaps others.

2. Advantages and Disadvantages

There is perhaps no advantage or disadvantage of one method of teaching over the other method in the amount of time required in outside preparation. Both methods require about the same amount of time in class; but perhaps slightly more time is required of the teacher in preparing the units of instruction than in using the textbook plan.

The test scores on the units of work indicate that

pupils with superior ability, comparatively, attain a higher standard of achievement under the Unit Plan of instruction than do like pupils under the textbook plan of instruction. Also, the low ability pupils, comparatively, achieve better when taught under the Unit Plan of instruction.

There is little or no advantage in either method of instruction for slower progressing pupils. This statement is based on subject-matter achievement.

The Unit Plan of instruction offers provisions for individual differences since it places activity upon the pupil instead of the teacher. In this experiment, the pupils expressed a preference for the Unit Plan of instruction over the traditional textbook plan of work. This must be considered of value and significant in that it affects the pupil's emotional set.

The Unit Plan offers an interesting challenge to the bright pupils through the supplementary work and additional problems, while the self-testing feature of each unit appeals to the weaker student. The Unit Plan may well be the key to differentiated content and teaching procedure, whether the classes are homogeneous or heterogeneous.

This plan is highly adaptable to the local environment, which makes it possible to introduce and teach skills that function because the pupils can understand the purpose for using them; that is, skills can be taught with most direct

reference to life interests or pupil needs. The so-called basic textbook is not always adaptable in this manner and therefore cannot be used consistently over a wide area as can the Unit Plan. To follow the textbook closely does not meet the pupil needs or requirements, which often vary over a wide range of ability and achievement even in single grades or classes. But the Unit Plan helps to enrich a course, promotes curiosity, and develops interest in learning and finding facts, and the pupil ability level can be used as a base upon which to build the units of work. The unit need not contain the non-functional material or unrelated drill units which so-called basic textbooks sometimes contain and which make for over-learning of non-essentials.

The Unit Plan conforms more nearly with the methods used in progressive schools in the teaching of arithmetic.

Children should do more reading and talking about numbers before they are confronted with formal reasoning problems. ¹

Older children should be encouraged to bring in from home problems found in the newspaper or advertisements, or problems of the home, such as balancing accounts and in checking grocery bills.²

The Unit Plan can qualify in these respects, and in addition it offers the feature of pupil-cooperation and self-motivated reaction.

1. Hildreth, Gertrude, Learning The Three R's. Minneapolis, Educational Publishers, Inc., [1936]. p. 776.

2. Ibid., p. 782.

The Unit Plan can simplify and collect terminology and eliminate the "catch" or the manufactured artificial problems which often appear in textbooks and are used without profit to the pupils. It seems appropriate to again quote Hildreth:

Most children deficient in problem solving are victims of too much textbook work. ³

And again:

The development of arithmetic reasoning problems in centers of activity carried on is much preferable to the assignment of problems from a textbook for remedial work. ⁴

3. Ibid., p. 775.

4. Ibid.

CHAPTER VI

SUMMARY

There were a number of factors beyond control in this experiment. In view of the limitations named in the conclusions and results as found in this study, the experimenter suggests that his experiment might indicate a possible tendency for groups of pupils studying under the Unit Plan to achieve more than groups of pupils studying under the textbook plan. It is possible that the data and cases of sampling are not enough to establish a fact to this effect.

However, if a large number of experiments of the same nature and with outcomes similar were reported, one could state with reasonable certainty that the Unit Plan of instruction in arithmetic for the seventh and eighth grades is better or superior to the textbook plan, whether the pupils are above or below average intelligence, and that the Unit Plan makes for more rapid progress with more interest, with an equal expenditure of time.

Since all students used in this experiment had had six and seven years of school work in arithmetic under the textbook plan of instruction, the tendency to continue in habits already established under this plan might not be

counter-balanced by the novelty or newness of the Unit Plan.

The experimenter feels, nevertheless, that the experiment has been worthwhile; that, with greater sampling of cases and increased numbers of units of study, the results would magnify those already found; and, that in his own experiment with all its limitations admitted, the Unit Plan of teaching arithmetic to seventh and eighth grade pupils is superior to the textbook plan of instruction.

A P P E N D I X

TABLE I

The Initial Testing Data of the Seventh Grade Group.

Name	Chrono- logical Age in Months	Mental Age	I. Q.	Arithme- tic Funda- mentals	General Achieve- ment
Bob Bock	145	185	128	43	97
Dean Heckel	150	173	116	28	89
Joe Starke	133	167	126	19	85
Evelyn McMillan	142	160	113	27	84
Dorothy DeGarmo	142	152	107	34	84
Bill Wilson	149	156	105	9	84
Raye D. Foss	153	138	90	34	83
Wilma J. Foss	153	154	100	21	80
Faye Bates	152	153	101	19	82
Janet Pifer	143	172	120	19	81
Merritt Hardie	156	136	87	19	78
Robert Denbo	155	161	104	16	75
Alton Neil	171	136	80	12	70
Wayne Eddingfield	145	130	90	5	69
Delma Rader	174	147	85	35	68
Cleo Cole	188	134	71	27	64
Ethel Suiter	140	118	84	9	56

TABLE II

The Initial Testing Data of the Eighth Grade Group.

Name	Chrono- logical Age in Months	Mental Age	I. Q.	Arithme- tic Funda- mentals	General Achieve- ment
Carmen Hardie	169	200	119	59	105
June Wilson	148	193	130	53	104
Dorothy M. Parton	164	182	111	52	102
Robert Lamb	155	182	117	31	97
Calvin Fuqua	163	179	110	45	94
Betty Jo Cotton	158	174	110	35	94
Bernice Breneman	163	171	105	50	92
George Ballinger	154	176	114	35	91
Jackie Pifer	173	158	97	30	89
Wand Lee Kearns	154	160	104	36	87
G. R. Harman, Jr.	174	161	95	22	88
Opal Stimatze	161	157	98	60	87
Barbara Holland	159	173	109	43	87
Dale Graebner	157	152	97	27	86
Lenore Foley	156	159	102	45	86
Ruth DeBusk	157	165	105	25	80
Kenneth Becker	156	160	103	26	79
Vernie Hall	190	149	78	27	77
Betty Mundee	167	157	94	44	76
Ruth McMillan	190	157	83	23	73
LeRoy Bartlett	186	144	77	35	69

TABLE III

The Computation of the Average and the Standard Deviation of the General Achievement Test Scores for the Eighth Grade.

Guessed Average	Scores	F	D	FD	FD^2
	105-109	1	4	4	16
	100-104	2	3	6	18
	95-99	1	2	2	4
	90-94	4	1	4 (+16)	4
87.5	85-89	7			
	80-84	0	-1		
	75-79	4	-2	-8	16
	70-74	1	-3	-3	9
	65-69	1	-4	-4 (-15)	16
Sums		21		1	83

$$GA = 87.5$$

$$c = 1/21 = 0.0476$$

$$c^2 = 0.0023$$

$$C = 0.0476 \times 5 = 0.2380$$

$$\text{Average} = 87.5 + 0.2380 = 87.738$$

$$c = \text{Step interval correction.} \quad SD = 9.9375$$

$$C = \text{Score correction.}$$

$$S = \text{Step interval which is 5.}$$

$$SD = \sqrt{\frac{\sum FD^2}{N} - c^2 \times S}$$

$$SD = \sqrt{\frac{83}{21} - 0.0023 \times 5}$$

TABLE IV

The Computation of the Average and the Standard Deviation of Intelligence Quotients of the Eighth Grade.

Guessed Average	Scores of I.Q.	F	D	FD	FD ²
	130-134	1	6	6	36
	125-129	0	5	0	0
	120-124	0	4	0	0
	115-119	2	3	6	18
	110-114	4	2	8	16
	105-109	3	1	3 (+23)	3
102.5	100-104	3			
	95-99	3	-1	-3	3
	90-94	2	-2	-4	8
	85-89	0	-	0	0
	80-84	1	-4	-4	16
	75-79	2	-5	-10 (-21)	50
Sums		21		2	150

$$GA = 102.5$$

$$c^2 = 2/21 = 0.0952$$

$$c^2 = 0.0091$$

$$C = 0.0952 \times 5 = 0.4760$$

$$\text{Average} = 102.5 + 0.4760 = 102.976$$

c = Step interval correction.

C = Score correction.

$$SD = \sqrt{\frac{2FD^2}{K} - c^2 \times S}$$

$$SD = \sqrt{\frac{150}{21} - .0091 \times 5}$$

S = step interval
which is 5.

TABLE V

The Computation of the Average and the Standard Deviation of the Arithmetic Fundamentals Scores of the Eighth Grade.

Guessed Average	Scores	F	D	FD	FD ²
	60-64	1	5	5	25
	55-59	1	4	3	9
	50-54	3	3	9	27
	45-49	2	2	4	8
	40-44	2	1	2 (+24)	2
37.5	35-39	4			
	30-34	2	-1	-2	2
	25-29	4	-2	-8	16
	20-24	2	-3	-6 (-16)	18
Sums		21		8	114

$$GA = 37.5$$

$$c = 8/21 = 0.3810$$

$$c^2 = 0.1452$$

$$C = 0.3810 \times 5 = 1.9050$$

$$\text{Average} = 37.5 + 1.9050 = 39.405$$

c = Step interval correction.

C = Score correction.

$$SD = \sqrt{\frac{\sum FD^2}{N} - c^2 \times S}$$

$$SD = \sqrt{\frac{114}{21} - 0.1452 \times 5}$$

$$SD = 11.482$$

S = Step interval
which is 5.

TABLE VI

The Computation of the Average and the Standard Deviation of the General Achievement Test Scores for the Seventh Grade.

Guessed Average	Scores	F	D	FD	FD ²
	95-99	1	4	4	16
	90-94	0	3		
	85-89	2	2	4	8
	80-84	7	1	7 (+15)	7
72.5	75-79	2			
	70-74	1	-1	-1	1
	65-69	2	-2	-4	8
	60-64	1	-3	-3	9
	55-59	1	-4	-4 (-12)	16
Sums		17		3	65

$$GA = 72.5$$

$$c = 3/17 = 0.1765$$

$$c^2 = 0.0312$$

$$C = 0.1765 \times 5 = 0.8825$$

$$\text{Average} = 72.5 + 0.8825 = 73.3825$$

$$c = \text{Step interval correction.}$$

$$C = \text{Score correction.}$$

$$SD = \sqrt{\frac{\sum FD^2}{1} - c^2 \times 5}$$

$$SD = \sqrt{\frac{65}{17} - 0.0312 \times 5}$$

$$SD = 9.7300$$

$$s = \text{Step interval which is 5.}$$

TABLE VII

The Computation of the Average and the Standard Deviation of Intelligence Quotients of the Seventh Grade.

Guessed Average	Scores Of I.Q.	F	D	FD	FD ²
	125-129	2	6	12	72
	120-124	1	5	5	25
	115-119	1	4	4	16
	110-114	1	3	3	9
	105-109	2	2	4	8
	100-104	3	1	3 (+ 31)	3
97.5	95-99	0			
	90-94	2	-1	-2	2
	85-89	2	-2	-4	8
	80-84	2	-3	-6	18
	75-79	0	-4	0	0
	70-74	1	-5	-5 (- 21)	25
Sums		17		10	186

$$GA = 97.5$$

$$c = 10/17 = 0.5882$$

$$c^2 = 0.34597 \text{ or } 0.3460$$

$$C = 0.5882 \times 5 = 2.941$$

$$\text{Average} = 97.5 + 2.941 = 100.441$$

c = Step interval correction.

C = Score correction.

$$SD = \sqrt{\frac{\sum FD^2}{N} - c^2 \times S}$$

$$SD = \sqrt{\frac{186}{17} - 0.346 \times 5}$$

$$SD = 16.2755$$

TABLE VIII

The Computation of the Average and the Standard Deviation of the Arithmetic Fundamentals Scores of the Seventh Grade.

Guessed Average	Scores	F'	D	FD	FD ²
22.5	40-44	1	4	4	16
	35-39	1	3	3	9
	30-34	2	2	4	8
	25-29	3	1	3 (+14)	3
	20-24	1			
	15-19	5	-1	-5	5
	10-14	1	-2	-2	4
	5-9	3	-3	-9 (-16)	29
Sums		17		- 2	72

$$GA = 22.5$$

$$c = -2/17 = -0.1177$$

$$c^2 = 0.0139$$

$$C = -0.5885$$

$$\text{Average} = 22.5 - 0.5885 = 21.9115$$

$$SD = \sqrt{\frac{\sum FD^2}{N} - c^2 \times S}$$

$$SD = \sqrt{72/17 - .0139 \times 5}$$

$$SD = 10.2875$$

TABLE IX

The Weighted Test Scores of the Eighth Grade Pupils in Arithmetic Fundamentals and General Achievement According to the Variability of the Test Scores. The SD of the I.Q. of These Pupils Accepted as the Weight Standard and Valued as Unity.

Name	Arithmetic Fundamentals		General Achievement	
	Average = 39.405		Average = 87.738	
	SD = 11.48		SD = 9.94	
	Weight = 1.16		Weight = 1.34	
	New Sigma = 13.32		New Sigma = 13.32	
	Score	Weighted	Score	Weighted
Carmen Hardie	59	68.44	105	140.70
June Wilson	53	61.48	104	139.36
Dorothy M. Parton	52	60.32	102	136.68
Robert Lamb	31	35.96	97	129.98
Calvin Fuqua	45	52.20	94	125.96
Betty Jo Cotton	35	40.60	94	125.96
Bernice Breneman	50	58.00	92	123.28
George Ballinger	35	40.60	91	121.94
Jackie Pifer	30	34.80	89	119.26
Wanda Lee Kearns	36	41.76	89	119.26
G. R. Harman, Jr.	22	25.52	88	117.92
Opal Stimatze	60	69.60	87	116.58
Barbara Holland	43	49.88	87	116.58
Dale Graebner	27	31.32	86	115.24
Lenore Foley	45	52.20	86	115.24
Ruth DeBusk	25	29.00	80	107.20
Kenneth Becker	26	30.16	79	105.86
Vernie Hall	27	31.32	77	103.18
Betty Mundee	44	51.04	76	101.84
Ruth McMillan	23	26.68	73	97.82
LeRoy Bartlett	35	40.60	69	92.46

TABLE X

The Weighted Test Scores of the Seventh Grade Pupils in Arithmetic Fundamentals and General Achievement According to the Variability of the Test Scores. The SD of the I.Q. of These Pupils Accepted as the Weight Standard and Valued as Unity.

Name	Arithmetic Fundamentals		General Achievement	
	Average = 21.9115		Average = 73.3825	
	SD = 10.2875		SD = 9.736	
	Weight = 1.58		Weight = 1.67	
	New Sigma = 16.25		New Sigma = 16.26	
	Score	Weighted	Score	Weighted
Bob Bock	43	67.94	97	161.99
Dean Heckel	28	44.24	89	148.63
Joe Starke	19	30.02	85	141.95
Evelyn McMillan	27	42.66	84	140.28
Dean DeGarmo	34	53.72	84	140.28
Bill Wilson	9	14.22	84	140.28
Raye D. Foss	34	53.72	83	138.61
Faye Bates	19	30.02	82	136.94
Janet Pifer	19	30.02	81	135.27
Wilma J. Foss	21	33.18	80	133.60
Merritt Hardie	19	30.02	78	130.26
Robert Denbo	16	25.28	75	125.25
Alton Neil, Jr.	12	18.96	70	116.90
Wayne Eddingfield	5	7.90	69	115.23
Delma Rader	35	55.30	68	113.56
Cleo Cole	27	42.66	64	106.88
Ethel Suiter	9	14.22	56	93.52

TABLE XI

The Composite Scores from the Weighted Test Scores of the
Initial Testing Data of the Eighth Grade Pupils.

Name	I. Q. Weighted (Unity)	Arithmetic Fundamentals Weighted	General Achievement Weighted	Composite
Carmen Hardie	119	68.44	140.70	328.14
June Wilson	130	61.48	139.36	330.84
Dorothy M. Parton	111	60.32	136.68	308.00
Robert Lamb	117	35.96	129.98	282.94
Calvin Fuqua	110	52.20	125.96	288.16
Betty Jo Cotton	110	40.60	125.96	276.56
Bernice Breneman	105	58.00	123.28	291.28
George Ballinger	114	40.60	121.94	276.54
Jackie Pifer	97	34.80	119.26	251.06
Wanda Lee Kearns	104	41.76	119.26	265.02
G. R. Harman, Jr.	93	25.52	117.92	236.44
Opal Stimatze	98	69.60	116.58	284.18
Barbara Holland	109	49.88	116.58	275.46
Dale Graebner	97	31.32	115.24	284.18
Lenore Foley	102	52.20	115.24	269.44
Ruth DeBusk	105	29.00	107.20	241.20
Kenneth Becker	103	30.16	105.86	239.02
Vernie Hall	78	31.32	103.18	212.50
Betty Munde	94	51.04	101.84	246.88
Ruth McMillan	83	26.68	97.82	207.50
Leroy Bartlett	77	40.60	92.46	210.06

TABLE XII

The Composite Scores from the Weighted Test Scores of the Initial Testing Data of the Seventh Grade Pupils. The Composite Scores have been Rounded Off to the Nearest Whole Number.

Name	I. Q. Weighted (Unity)	Arithmetic Fundamentals Weighted	General Achievement Weighted	Composite
Bob Bock	128	67.94	161.99	358
Dean Heckel	116	44.24	148.63	309
Joe Starke	126	30.02	141.95	298
Evelyn McMillan	113	42.66	140.28	296
Dean DeGarmo	107	53.72	140.28	301
Bill Wilson	105	14.22	140.28	260
Raye D. Foss	90	53.72	138.61	282
Faye Bates	101	30.02	136.94	268
Janet Pifer	120	30.02	135.27	285
Wilma J. Foss	100	33.18	133.60	267
Merritt Hardie	87	30.02	130.26	247
Robert Denbo	104	25.28	125.25	255
Alton Neil, Jr.	80	18.96	116.90	216
Wayne Eddingfield	90	7.90	115.23	213
Delma Rader	85	55.30	113.56	254
Cleo Cole	71	42.66	106.88	221
Ethel Suiter	84	14.22	93.52	192

TABLE XIII

The Paired Pupils of the Eighth Grade Based on Their Composite Scores from I. Q., Arithmetic Fundamentals, and General Achievement. The Composite Scores in this Table have been Rounded Off to the Nearest Whole Number.

Group A		Group B		Difference in Paired Scores
Name	Composite Score	Name	Composite Score	
June Wilsqn	331	Carmen Hardie	328	3
Calvin Fuqua	288	Bernice Breneman	291	3
Dale Graebner	284	Opal Stimatze	284	0
George Ballinger*	277	Robert Lamb	283	6
Barbara Holland	276	Betty Jo Cotton	277	1
Lenore Foley	269	Wanda Lee Kearns	265	4
Betty Mundee	247	Jackie Pifer	251	4
Ruth DeBusk	241	Kenneth Becker	239	2
Vernie Hall	213	Leroy Bartlett	210	3
Total**	2426	Total**	2428	

* This boy moved away from school before the experiment was well under way. This fact removed the pair from the experiment.

Three students were not paired for the experiment because of the wide range in the difference of their composite scores.

**Corrected group totals, after the removal of the pair marked *, are Group A, 2149; and Group B, 2145.

TABLE XIV

The Paired Pupils of the Seventh Grade Based on their Composite Scores from I. Q., Arithmetic Fundamentals, and General Achievement.

Group A		Group B		Difference in Paired Scores
Name	Composite Score	Name	Composite Score	
Dean Heckel	309	Dean DeGarmo	301	8
Evelyn McMillan	296	Joe Starke	298	2
Janet Pifer	285	Raye D. Foss	282	3
Faye Bates*	268	Wilma J. Foss	267	1
Robert Denbo	255	Bill Wilson	260	5
Merritt Hardie	247	Delma Rader	254	7
Alton Neil, Jr.	216	Wayne Eddingfield	213	3
Total**	1875	Total**	1876	

* This boy moved away from school before the experiment was well under way. This fact removed the pair from the experiment.

Three students were not paired for the experiment because of the wide range in the difference of their composite scores.

**Corrected group totals, after the removal of the pair marked *, are Group A, 1608; and Group B, 1608.

I. INTRODUCTION:

You are to learn that per cent is only another name and notation for hundredths. Percentage is computing by hundredths. Thus, to find 7% of 340 is to find .07 times 340, which is 23.80. You will note that the per cent sign (%) takes the place of two decimal places. In the sample given, 7% is the RATE of per cent, or the number of hundredths to be found. The BASE is the number of which a certain per cent is to be found. The PERCENTAGE is the result obtained by taking a certain per cent of the BASE.

Any fact expressed in per cent language can also be expressed in fraction and in decimal language. 100% is the whole or 1 of anything. Per cents of less than 100% represent quantities less than a whole. 6% means $6/100$ or .06. Per cents greater than 100% represent quantities greater than 1. 125% means $1\ 25/100$ or $1\frac{1}{4}$; it also means 1.25. Good work in percentage is squarely based on the ability to write the same fact in all three languages: (1) per cent, (2) fraction, (3) decimal language.

In a completed percentage example, there are always three facts. These are two numbers and a per cent. In any example or problem to be worked, one of these three facts is missing. The answer to be found is the third fact.

These illustrations show the three uses of percentage. Three facts: 840; 420; and 50%.

(a) To find the per cent of a number. Find 50% of 840. $840 \times .50 = 420$.

(b) To find what per cent one number is of another. 420 is what per cent of 840?
 $420 \div 840 = .5$ or 50%.

(c) To find the whole. If 420 is 50% of a number, what is the number? $420 \div .50 = 840$.

It is important to remember that in almost every problem in percentage these methods must be known so that one may be used to obtain the desired result.

II. OBJECTIVES:

1. To learn the meaning of per cent.
2. To learn how to change fractions to per cents.
3. To learn how to find the per cent of a number:
 - (a) Short method.
 - (b) Per cents of 100 and larger.
 - (c) Per cents smaller than one.

4. To find what per cent one number is of another.
5. To find a number when a per cent of it is known.
6. To learn how to make practical applications of per cent.

III. REFERENCES FOR READING AND STUDY:

1. Brown, Joseph C. et al. Champion Arithmetics. Bk. VI. pp. 84-120.
2. Barber, Harry C. Junior High School Mathematics. Seventh Year. pp. 50-59; 65-66; 67-70; p. 209, Test 57. pp. 214-215; Tests, LXXIV; LXXV; LXXVI; LXXVII; LXXVIII.
3. Hart, Walter W. Junior High School Mathematics. Bk. I. Chapter IV; Chapter V; Chapter VI.
4. Stone, John C. Junior High School Mathematics. Bk. I. pp. 11-12; 16-18.
5. Stone, John C. The Stone Arithmetic, Advanced. p. 56, Chapter 56.
6. Knight, Ruch, Studebaker Standard Service Arithmetic Work-Book. pp. 65-78.
7. Compton's Pictured Encyclopedia. vol. 2, p. 120, "The Meaning of Per Cent." Also, vol. 7, p. 2724, "Percentage."

IV. DIRECTIONS AND ASSIGNMENTS:

(You are to feel free to consult your instructor about your work at any time.)

FIRST WEEK:

1. Read to find out about the meaning of per cent. See Compton's Pictured Encyclopedia. Study the Introduction. See also the Champion Arithmetics, Bk. III, p. 86.
2. Work all the problems on p. 53, Barber's Junior High School Mathematics. Note carefully the sample problem No. 30.
3. Find several (5 or 6) uses of per cent in magazines or the newspapers. Clip them out and bring them to class for discussion. Try to be prepared to tell the meaning and use of per cent.
4. How are baseball standings recorded? Find some of these records in newspapers and bring them to class for study. How do banks determine the cost to their customers for the use of money?
5. Make a table of problems 2-7, p. 86, Champion Arithmetics. Have your work ready to hand in at class time.

SECOND WEEK:

1. Do the problems 3-25 from Barber, pp. 65-66, under "Finding a Per Cent of a Number."
2. Do Test LXXIV from Barber, p. 214. Make sure your work is neat and correct before handing it in to the class.
3. This assignment is a drill on finding what per cent one number is of another. See the Introduction explanation and also Stone, Junior High School Mathematics, Bk. I, p. 17, Problem 21. Do Problems 22-36 from this page.
4. This assignment is to help you learn an easy way to write fractional per cents. See Hart, Bk. I., p. 59. Note sample I carefully. Do exercise 39, Problems 1-10.
5. This will help you to learn how to increase or decrease a number by a certain per cent. Do drill exercise 43, p. 67, Hart, Junior High School Mathematics, Book I. Note the examples 1 and 2. Problems 1-14.

THIRD WEEK:

1. From your observation, invent and solve problems dealing with per cent. For example: A coat in a store window is marked \$75, less 10% for cash. What is the cash selling price of the coat?
2. Copy and supply the missing values in the blanks of the table on pp. 64-65, problems 1-48, The Stone Arithmetic, Advanced.
3. State the meaning of the problems on p. 90, Champion Arithmetics, Bk. III, and note that some of the examples have more than one meaning. One meaning each is sufficient for this paper.
4. Drill - No advanced work (Short Method. C. 94-96).
5. Do the work outlined in the Champion Arithmetics, p. 106.

FOURTH WEEK:

1. Do the check-up work on percentage, p. 118, Champion Arithmetics, Problems 1-9, columns a, b, c, and d.
2. Drill - No advanced assignment (Work-Book). (pp. 69-76).

3. Drill continued. (Work-Book, pp. 77-78).
4. Review and Drill.
5. Test on the unit.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE - (Choose one. The work should be completed on the pupil's choice before the test over the unit.)

1. Make a table record of attendance in your room for three weeks, using per cents to show the number present and absent.
2. Make a table of the football games played by Macksville, showing the per cent of games won and lost.
3. Make a dictionary of all the new terms learned in the study of this unit.
4. Make a collection of newspaper clippings illustrating the many uses of per cent or percentage.
5. Choose some stock quoted in a daily paper and record the per cent of loss or gain over a period of two weeks.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT:

What is the meaning of per cent?

Of what denominator do you think when you see the sign %?

Can you tell how per cents are used in making comparisons, and why?

Can you name three steps in finding what per cent one number is of another?

Can you change a common fraction to a decimal? The decimal to a per cent?

Do you understand the language of per cent?

Can you use per cents to increase or decrease a number?

Can you use percentage in finding the profit or loss of money?

Can you recognize the BASE in a percentage problem? the RATE? the PERCENTAGE?

Do you know a short way to find the per cent of a number?

Can you find per cents of numbers when the per cents are greater than 100?

Can you find the number when a per cent of it is known?

N. B. The student should not postpone the use of this division until the last week of the study on the unit. He should use it from time to time as he progresses through the unit, checking off the questions and statements with which he is familiar.

. # .

- ① 1. Express briefly the meaning of per cent: *Percent means hundredths.*
- ② 2. Change these fractions and mixed numbers to decimals and then to per cents:

$$3/8 \quad \underline{.375} \quad \underline{37.5\%} \quad 2/3 \quad \underline{.66\frac{2}{3}} \quad \underline{66\frac{2}{3}\%}$$

$$2/5 \quad \underline{.40} \quad \underline{40\%} \quad 5/6 \quad \underline{.83\frac{1}{3}} \quad \underline{83\frac{1}{3}\%}$$

$$1 \frac{1}{2} \quad \underline{1.50} \quad \underline{150\%} \quad 1 \frac{3}{4} \quad \underline{1.75} \quad \underline{175\%}$$

- ③ 3. Change each of these per cents to decimals; then change each decimal to a common fraction in its lowest terms:

$$25\% \quad \underline{.25} \quad \underline{\frac{1}{4}} \quad 15\% \quad \underline{.15} \quad \underline{\frac{3}{20}}$$

$$17\% \quad \underline{.17} \quad \underline{\frac{17}{100}} \quad 40\% \quad \underline{.40} \quad \underline{\frac{2}{5}}$$

$$1\% \quad \underline{.01} \quad \underline{\frac{1}{100}} \quad 8\% \quad \underline{.08} \quad \underline{\frac{2}{25}}$$

- ④ 4. Work these examples. You may use the back of this sheet for figuring. Write your answers in the proper space here.

$$5\% \text{ of } 450 \text{ is } \underline{22.50} \quad 3\frac{1}{2}\% \text{ of } 4,800 \text{ is } \underline{168}$$

$$72.5\% \text{ of } 17,850 \text{ is } \underline{12941.25} \quad 112\% \text{ of } 16 \text{ is } \underline{17.92}$$

$$1/2\% \text{ of } \$85,655.00 \text{ is } \underline{\$428.28} \quad 1/4\% \text{ of } \$28,985 \text{ is } \underline{\$7.246}$$

- ⑤ 5. Use the shortest method that you know to solve the following: (Show your work here.)

$$50\% \text{ of } \$360 \quad \underline{\frac{1}{2} \times \$360 = \$180} \quad 12\frac{1}{2}\% \text{ of } 72 \quad \underline{\frac{1}{8} \times 72 = 9}$$

$$33 \frac{1}{3}\% \text{ of } 96 \quad \underline{\frac{1}{3} \times 96 = 32} \quad 75\% \text{ of } 48.60 \quad \underline{\frac{3}{4} \times 48.60 = 36.45}$$

$$16 \frac{2}{3}\% \text{ of } 1,760 \quad \underline{\frac{1}{6} \times 1760 = 293\frac{1}{3}} \quad 20\% \text{ of } 355 \quad \underline{\frac{1}{5} \times 355 = 71}$$

- ⑥ 6. Write your answers to these examples on this page.

$$16 \text{ is what per cent of } 20? \quad \underline{80\%} \quad 25\% \text{ of } ? \text{ is } 87? \quad \underline{348}$$

$$9 \text{ is what per cent of } 54? \quad \underline{16\frac{2}{3}\%} \quad ?\% \text{ of } 8 \text{ is } 64? \quad \underline{800\%}$$

$$175\% \text{ of } ? \text{ is } 749? \quad \underline{425.71+} \quad 40\% \text{ of } ? \text{ is } 256? \quad \underline{640}$$

- ⑦ 7. A real estate dealer sold a house for \$4,800, and was paid a commission of $3\frac{1}{2}\%$. How much was his commission? \$168

- ⑧ 8. A cow gave 10,620 pounds of milk containing 4.1% butterfat. What was the value of the butterfat at 24¢ per pound? \$104.50

- ⑨ 9. A dealer buys shoes at \$3.75 a pair and sells them at $33 \frac{1}{3}\%$ more than he paid for them. What is the selling price per pair? \$5.00

- ⑩ 36 of the 450 pupils in a school are in the 7th grade.
What per cent of the pupils are in that grade? 8%
- ⑪ Increase \$67.50 by 20%. It is now \$ 81.00.
- ⑫ What will a bedroom suite marked at \$112.50 cost after a reduction of 20%? \$ 90.00
- ⑬ A man invested \$825 and made a profit of 12% on his investment. What was his profit? \$ 99.00
- ⑭ What is the interest on \$420 at 6% for 2 years? \$50.40

51 possible

UNIT II

I. INTRODUCTION:

Now that you have learned the meaning of per cent, we shall turn our attention to its application. Probably the most common uses of percentage are to be found in commission, discount, profit and loss, and interest. The business man has to deal with these almost daily, and nearly everyone has a need to know something about these processes from time to time.

II. OBJECTIVES:

1. To learn how to use percentage in finding commission.
2. To learn how to find discounts--trade and cash.
3. To learn how to use percentage in finding profit and loss.
4. To learn how to find interest--for more than a year; less than a year; and how to use the cancellation method.

III. REFERENCES FOR READING AND STUDY:

1. Brown, Joseph C. et al. Champion Arithmetics. Bk. III, pp. 121-153.
2. Barber, Harry C. Junior High School Mathematics. Seventh Year. pp. 67-70; 70-73; 153-172; 125; 140-141; 226.
3. Stone, John C. Junior High School Mathematics. Bk. I. Chapter VI, p. 117.
4. Hart, Walter W. Junior High School Mathematics. Bk. I. Chapter V, p. 66.
5. Stone, John C. The Stone Arithmetic, Advanced. Chapters, IV, p. 56 and V, p. 78.
6. Compton's Pictured Encyclopedia:
Vol. 11, p. 120-122
Vol. 4, p. 150
Vol. 2, p. 43-45
Vol. 13, p. 291
Vol. 14, p. 148
7. The World Books:
Vol. 3, p. 1802
Vol. 8, p. 432
Vol. 5, p. 3010-3012
8. Knight, Ruch, Studebaker Standard Service Arithmetic Work-Book.

IV. DIRECTIONS AND ASSIGNMENTS:

(Feel free to consult your instructor about your work at any time.)

FIRST WEEK:

1. Read to find the meaning of commission. Find the meaning of the following: gross proceeds; net proceeds; agent; principal; commission merchant; rate of commission; and broker.
2. Work problems. Barber, pp. 67-68. Problems 1-9 (numbers are inclusive).
3. Work problems. Stone, pp. 128-129. Problems 1-12.
4. Work problems. Champion Arithmetics, p. 126. Problems 1-8.
5. Work problems. Barber, pp. 68-70. Problems under Discount, 1-13.

SECOND WEEK:

1. Read to find the meaning of profit and loss. Find the meaning of the following and be able to illustrate: margin, cost, selling price, overhead, profit, loss, wholesale, retail, trade discount, gross profit, net profit, net loss, consumer, and producer.
2. Work problems. Stone, advanced, p. 92. Problems 1-10. Drill exercises.
3. Work problems. Barber, p. 153-156. Problems 3-21.
4. Study Champion Arithmetics, p. 128. Learn the meaning of the words printed in italics. Do problems same page 2-12.
5. Work problems. Barber, p. 156-160. Problems 24-33.

THIRD WEEK:

1. Continue work of last Friday (No. 5 of SECOND WEEK). Begin problem p. 159, Problem 37 and continue to Problem 51.
2. Read to learn the meaning of the following: interest, rate of interest, principal, amount, annum, promissory note, time, bank discount, capital, simple and compound interest. Learn formula for finding interest.
3. Work problems. Barber, p. 179. Problems 1-12. Put in table form.

4. Work problems. Barber, p. 180. Problems 16-26. Put in table form.
5. Work problems. Hart, Bk. I., p. 101, Problems 1-15.

FOURTH WEEK:

1. Work problems. Hart, Bk. I, p. 103. Problems 1-15.
2. Work problems. Hart, Bk. I, p. 104-105. Problems 1-20.
3. Drill work. Interest.
4. Review (Bring your questions).
5. Test on the Unit.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one.
The work should be done before the test over the unit.)

1. Write the definition of all the new terms studied in this unit.
2. Make an oral report to the class on price codes. Illustrate (See Champion Arithmetics, Bk. III. p. 138).
3. Make a report on early banking and interest.
4. Devise or find formulas to use in solving problems in commission, discount, profit and loss, and interest. Illustrate your formula.
5. Report and illustrate orally (or written) the six-per-cent method in interest finding.
6. Illustrate with a sample problem all working possibilities of this formula: $I = p r t$.
7. Draw and properly fill 10 business forms.
8. Clip from newspapers and magazines advertisements and material which illustrate practical applications of percentage. Examples are: sales offering discounts, investment advertisements, etc. Try to find them for Commission, Discount, Profit and Loss, and Interest.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT. (The student should, from time to time, check off the following statements and questions as he becomes familiar with them. Do not postpone the use of this division of study until the last week.)

1. Can you fill in words which will make each statement below complete?

- (a) Two hundred fifty per cent of a number is the same as _____ times the number.
- (b) Margin includes the _____ and the _____.
- (c) A discount of "1/3 off" is _____ more than two discounts of 10% and 20%.
- (d) When the margin on a sale is greater than the overhead, the sale results in a _____.
- (e) Per cent of profit based on selling price is _____ than per cent of profit based on cost.
- (f) If the margin is less than the overhead, the sale results in a _____.
- (g) If a merchant reduces his overhead, but the cost and the selling price are not changed, the profit is _____.
- (h) Per cent means _____.
- (i) When a profit is made on a sale, the margin includes the _____ and the _____.
- (j) Advance is a per cent of the _____ of goods.
- (k) The fee paid to a real estate agent for selling a property is called the _____.
- (l) The interest on a given sum of money increases as the _____ or the _____ or both increase.
- (m) Thirty-seven and a half per cent of a number is the same as _____ of the number.
- (n) A discount of "1/5 off" is _____ than 25% off.

2. Can you define these:

_____ Rate of commission; _____ net proceeds; _____ agent; _____ commission merchant; _____ rate of discount; _____ discount; _____ net amount or net price; _____ trade and cash discounts; _____ margin; _____ cost; _____ selling price; _____ overhead; _____ profit; _____ loss; _____ principal; _____ amount; _____ rate; _____ per annum; _____ list price; _____ price code; _____ time; _____ interest.

3. Can you explain the occasion for these: "Clearance Sale", "Removal Sale", "Pre-inventory Sale", "Fire Sale", "Dollar Day", "Bargain Sale".

4. Can you find the commission on a sale when the rate of commission is given?

5. Can you find the discount in dollars and cents when the rate of discount is given?
6. Do you know a short method to find discounts, when certain rates are given, as $16 \frac{2}{3}\%$?
7. Can you find the net price, when the marked price and rate of discount are given?
8. Can you use the cancellation method in solving interest problems?
9. Can you make up a problem involving percentage--one that affects our everyday life at school and at home?
10. Are you accurate in the addition and subtraction of fractions?
11. Can you quickly and accurately divide and multiply fractions?
12. Can you find the interest for less than a year in time?
13. Are you accurate in pointing off multiplications involving decimals?
14. Can you correctly fill a promissory note, or make one from memory?
15. Can you tell why discounts are given?

. # .

Test 2

1. How much is:

- a. 65% of \$72? \$46.80
 b. 50% of 650 lbs.? 325 lbs.
 c. 25% of 344 in.? 86 in.
 d. 76% of 25 bu.? 19 bu.
 e. 73% of 50 A.? 36.5 A.

2. Find:

- a. $12\frac{1}{2}\%$ of 48 6
 b. $\frac{1}{2}\%$ of \$440 \$2.20
 c. 100% of 80 80
 d. 150% of 16 24
 e. $33\frac{1}{3}\%$ of 21 7

3. Fill the blanks with words or numbers which will make the sentences sensible and complete:

- a. One hundred fifty per cent is the same as $1\frac{1}{2}$ times the number.
 b. When the profit on a sale is greater than the expense, the sale results in a profit.
 c. The per cent of profit based on the selling price is more than the same per cent of profit based on the cost.
 d. If the profit on a sale is less than the expense, the sale results in a loss.
 e. Per cent means 100ths.
 f. The interest on a sum of money increases as the principal or the rate or both increase.
 g. Thirty-seven and one-half per cent of a number is the same as $\frac{37}{8}$ (fraction) of the number.
 h. A discount of "1/5 off" is less than 25% off.
 i. The money paid to a salesman who sells on a percentage basis is called commission.
 j. Money paid for the use of money is called interest.

4. Solve the following. Place your answers in the spaces provided.

- a. At 5% commission, how much will a show salesman earn in a week, if his sales amount to \$657.75? \$32.89
 b. An agent made a sale of \$7,500 and received a $\frac{1}{2}\%$ commission. How much commission did he receive? \$37.50
 c. What discount would be allowed on a chair marked \$20 and for sale at a discount of 25%? \$5
 d. A bill of \$460 was received which was marked "2% for cash; net 30 days." What can be saved by paying cash? \$9.20. How much money should be remitted to pay the bill with cash? \$450.80.

- e. Find the selling price of a suit of clothes bought at wholesale for \$24, marked to sell for $33\frac{1}{3}\%$ more than the cost, and then was sold at a discount of 10% of the marked price. \$28.80

- f. Find the profit and the selling price on a bicycle bought by a merchant for \$36 and sold for 12% above cost. Profit \$4.32. Selling Price \$40.32.

- g. A dealer had purchased a car for \$625, on which he set the selling price at 10% above the cost, but finally sold for 15% less than the marked price. Was there a profit or loss, and how much? Loss \$40.63

- h. Find the interest on \$350 at 6% for a period of time of $2\frac{1}{2}$ years. \$52.50

- i. Find the interest on \$800 at $4\frac{1}{2}\%$ interest for a period of time of $\frac{1}{2}$ year. \$18.00

- j. Find the interest on \$600 at 6% interest for a period of time of 50 days. (Show your work below and use cancellation method for credit.) \$5.00

$$\frac{\$600 \times 6}{100} \times \frac{50}{360} = \$5.00$$

5. A Matching Test:

- | | |
|-------------------------------|---|
| <u>M</u> (1) Profit | A. A per cent or hundredths part to be paid for the use of borrowed money. |
| <u>Q</u> (2) Wholesale price | B. The total price paid by the buyer. |
| <u>S</u> (3) Trade Discount | C. The interest added to the principal. |
| <u>E</u> (4) Retail Price | D. The amount of money remaining after all costs and discounts are paid. |
| <u>E</u> (5) Interest | E. Money paid for the use of money. |
| <u>O</u> (6) Loss | F. The price paid by the consumer or user of merchandise. |
| <u>P</u> (7) Cash Discount | G. One in the employment of an individual or company. |
| <u>I</u> (8) Commission | H. The cost of doing business. |
| <u>A</u> (9) Rate of Interest | I. The rate in hundredths or per cent paid an agent for his services. |
| <u>L</u> (10) Time | J. An arrangement of letters or numbers to indicate the cost to the merchant. |
| <u>D</u> (11) Net Proceeds | K. Usually refers to the sum of money invested in borrowing or loaning. |
| <u>G</u> (12) Agent | L. The number of days, months, or years for which a sum of money is borrowed or loaned. |
| <u>T</u> (13) Discount | M. Amount of money received which exceeds cost is greater than total cost of something. |
| <u>R</u> (14) Margin | N. The price the customer pays for merchandise. |
| <u>B</u> (15) Cost | O. The result of selling for less than cost. |
| <u>N</u> (16) Selling Price | P. The discount allowed for cash payments. |
| <u>K</u> (17) Principal | Q. The price paid by the retail merchant. |
| <u>C</u> (18) Amount | R. Term meaning the same as gross profit. |
| <u>H</u> (19) Expense | S. Discount allowed by one merchant to another. |
| <u>J</u> (20) Price Code | T. An amount of money to be deducted or taken away from a given sum of money. |

I. INTRODUCTION:

This unit will be about some useful and interesting geometry. There are geometric figures about us at all times. It will be interesting to note some of these and to learn to recognize them when found anywhere. Buildings are the most commonly used things to illustrate practical geometry, but geometry or its use can be seen in our automobiles, in our rug patterns, at the dinner table, in the figures of our ties and dresses, and so on. For instance, this sheet of paper represents a plane figure called a rectangle. Other geometric figures are squares, triangles, trapezoids, circles, and hexagons. How many of these figures can you identify in the room now? Where can you remember having seen others?

II. OBJECTIVES:

1. To study the classes of angles so that we may be able to identify and define them.
2. To learn how to properly letter and read the geometric figure -
 - a. Use of capital letters.
 - b. Use of small letters.
 - c. Use of numbers.
3. To learn how to name lines -
 - a. Straight line.
 - b. Curved line.
 - c. Broken line.
4. To learn how to identify lines of position -
 - a. Vertical.
 - b. Oblique.
 - c. Horizontal.
 - d. Parallel.
 - e. Perpendicular.
5. To learn the class names of angles and how to identify them -
 - a. Right.
 - b. Straight.
 - c. Obtuse.
 - d. Acute.
6. To study the construction of the circle -
 - a. Circumference.
 - b. Center.
 - c. Diameter
 - d. Radius.
 - e. Arc.
 - f. Concentric.
 - g. Chord.

7. To learn how to use the protractor to measure angles and to construct them.
8. To learn the names of the different kinds of triangles.
9. To learn how to use the compasses in constructions.
10. To learn how to construct circle graphs.
11. To review fundamental processes.

III. REFERENCES FOR READING AND STUDY: (*Required)

1. *Compton's Pictured Encyclopedia. Vol. 6, pp. 46-51.
2. Brown, J. C. Champion Arithmetics. Bk. III, pp. 154-168.
3. Barber, Harry C. Junior High School Mathematics. Seventh Year. Chapter IV, p. 81.
4. Hart, Walter W. Junior High School Mathematics. Bk. I. Chapter VIII, p. 112. Also, Chapters IX and X.
5. Stone, John C. Junior High School Mathematics. Bk. I. Chapter VIII, p. 161.
6. Stone, John C. Stone's Advanced Arithmetic. Chapter VII, p. 104.

IV. DIRECTIONS AND ASSIGNMENTS;

FIRST WEEK:

1. List a number of geometric figures that you can see in the room about you. Name others found in nature, buildings, automobiles, homes, etc.
2. Learn how to define and illustrate the classes of angles. Letter or name them. Draw on paper. See Champion Arithmetics, Bk. III, p. 156, or Barber, p. 86.
3. Study Champion Arithmetics, pp. 159-160. Work problems p. 161.
4. Bring compasses and protractors to class for drill work (angles and constructions). Copy angles given in class. Study Stone's Junior High School Mathematics, Bk. I, pp. 166-167.
5. Do exercise 68, pp. 128-129, Hart. Answer all questions in exercise 69, pp. 129-130.

SECOND WEEK:

1. Do exercise 71, Hart.
2. Study the figures on p. 173, Stone, and copy on a larger scale.

3. Study pp. 164-165, Champion Arithmetics. Be able to answer all printed questions.
4. Study pp. 166-167, Champion Arithmetics.
5. Practice work with protractor and compasses. Drill.

THIRD WEEK:

1. Do work, p. 116, Stone's Advanced Arithmetic. Problems 1-7.
2. Do Problem 5, p. 119, Stone's Advanced Arithmetic.
3. Do Problems 36, 37, 38, Barber, p. 89.
4. Drill and review on the unit.
5. Test.

FOURTH WEEK:

(Not unit work--drill on fundamentals.)

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TO INVESTIGATE: (Choose one and complete it before taking the test on the unit.)

1. Construct 15 geometrical figures, letter, and name.
2. Make a dictionary of all new terms studied in the unit.
3. Design and show in large drawing, the plan or sketch for church window based on the Gothic arch.
4. Design a rug or wall paper based on the combination of these figures, or one of them--hexagon, square, rectangle, triangle, and circle.
5. You may construct a circular graph on data that you can collect. Have it approved before doing it.
6. Make a scale drawing of the school yard.
7. Make an 8" x 11" size drawing of each of the figures shown in Stone, pp. 172-173.
8. Make the drawings, on larger scale, shown in Hart, pp. 144-145.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT:



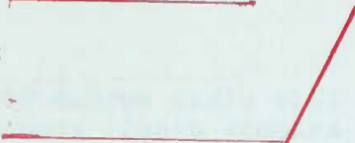

1. Can you define, illustrate, or identify the following:

Triangle____; square____; circle____; trapezoid____;
point____; vertical line____; horizontal line____;
straight line____; oblique line____; intersecting
lines____; parallel lines____; line segment____;
angle____; obtuse, acute, and right angles____;
vertex____; perpendicular line____; bisect and angle
____; measure and angle____; use a protractor to construct
an angle____; use the compasses to construct an angle____;
ray____.

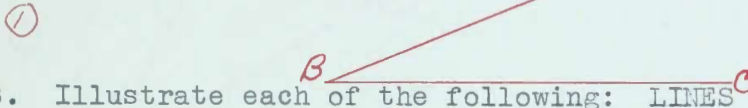
2. Can you construct a circular graph?
3. Can you readily identify the various lines of position?
4. Do you know the parts of the circle?
5. Have you fair judgment of the sizes of angles?
6. Have you read the assignment made from Compton's En-
cyclopedia?
7. Can you properly letter a triangle?
8. Can you use the compasses to bisect a line or an angle?
9. Can you use a piece of cord and a ruler to lay off a
square corner on the floor?
10. Can you recognize many geometrical figures in buildings,
nature, and so on?

GEOMETRIC FIGURES





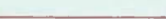

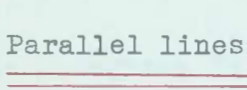
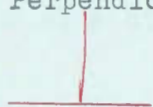
1. Draw the following angles:

- (4) (a) Right:  (b) Acute: 
- (c) Obtuse:  (d) Straight: 

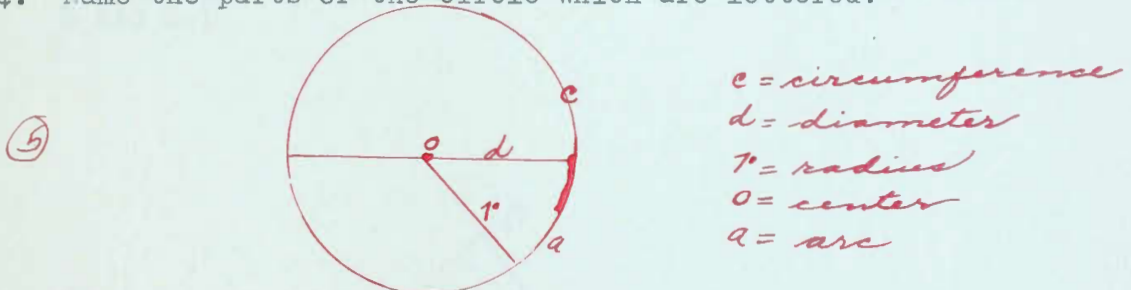
2. Draw any angle and name it ABC:



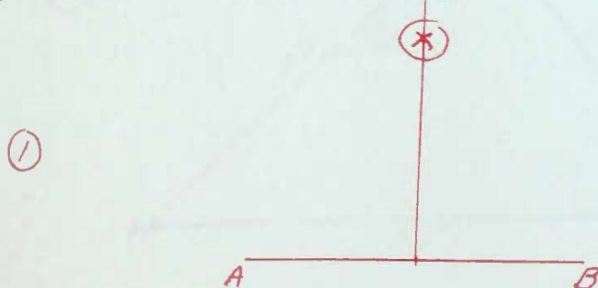
3. Illustrate each of the following: LINES

- (a) Straight line:  (b) Curved line: 
- (8) (c) Broken line:  (d) Vertical: 
- (e) Horizontal line:  (f) Oblique: 
- (g) Parallel lines:  (h) Perpendicular lines: 

4. Name the parts of the circle which are lettered:



5. Draw line AB 2" long and erect a perpendicular bisector:



6. Erect a perpendicular line dc to line AB at point C:

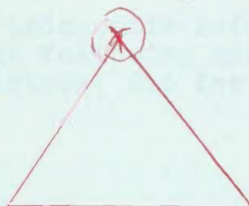
①

7. Construct a 60 degree angle with a protractor, and bisect it with compasses (leave compass marks to show method of bisection).

①

8. Construct an equilateral triangle of $1\frac{1}{2}$ " sides, using the compasses:

①

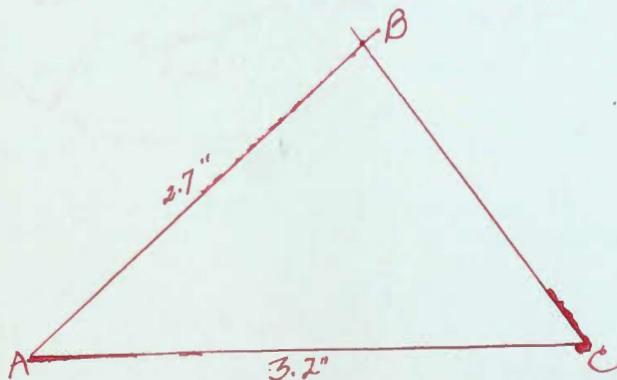


9. How many degrees in $\frac{1}{60} + \frac{1}{12} + \frac{1}{20}$ of a circle? 54°

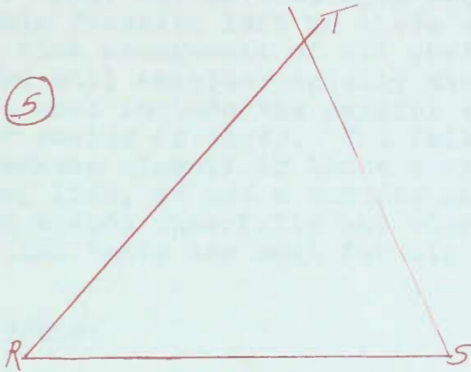
①

10. Draw triangle ABC. Angle A is 40 degrees; side AB is 2.7 inches; and side AC is 3.2 inches. (hint: Measure angles B and C.)

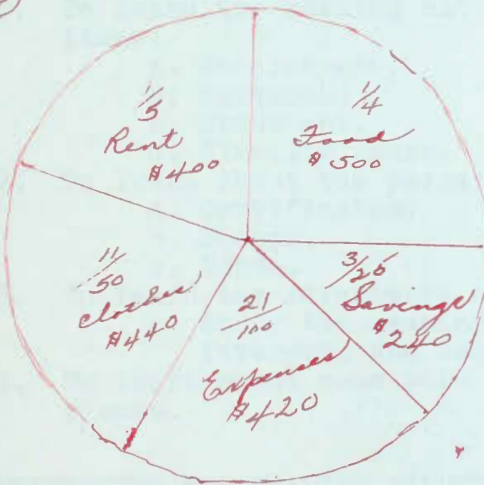
⑤



11. Draw Triangle RST. Side RS is 2.5 inches; Angle R is 48 degrees; Angle S is 67 degrees. (Hint: Check angle T.)



12. Make a circle graph using this information: An income of \$2000 is spent in the following manner: 25% for food; 20% for rent; 22% for clothes; 21% for general expenses; 12% for savings.



Item	Part	\$	Degrees
Food	$\frac{1}{4}$	\$500	90°
Rent	$\frac{1}{5}$	\$400	72°
Clothes	$\frac{11}{50}$	\$440	79.2°
Expenses	$\frac{21}{100}$	\$420	75.6°
Savings	$\frac{3}{25}$	\$240	43.2°
Total	$\frac{100}{100}$	\$2000	360°

I. INTRODUCTION:

"If you would know the value of money, go and try to borrow some; for he that goes a-borrowing goes a-sorrowing." Benjamin Franklin left us these words of wisdom. Thrift means wise management of all one's resources, but in this unit we will consider chiefly the wise management of money. Thrift must include the careful spending of money, as well as the saving of money. The fellow who hoards his money and refuses himself or those near to him even the necessities of life, is not a thrifty man. The really thrifty person spends cheerfully but wisely; he saves for future needs and "gets the most for his money."

II. OBJECTIVES:

1. To learn the true meaning of thrift.
2. To study about somebody who, through thrift, built up great fortunes.
3. To learn the relationship between installment buying and thrift.
4. To learn how to make a budget.
5. To learn how banks encourage thrift.
6. To learn the meaning and to study banking terms and practices:
 - a. Endorsement.
 - b. Passbook.
 - c. Statement.
 - d. Clearing house.
7. To learn about the postal saving accounts:
 - a. Certificates.
 - b. Stamps.
 - c. Bonds.
8. To learn the advantages of the savings banks:
 - a. Study the meaning of compound interest, annual interest, and semi-annual interest.
9. To learn about some safe ways to send money to other places.

III. REFERENCES FOR READING AND STUDY:

1. Compton's Pictured Encyclopedia, vol. 14, Thrift.
2. Brown, Joseph C. et al. Champion Arithmetics. Bk. III, pp. 225-253.
3. Stone, John C. Advanced Arithmetic. Chapter VI.
4. Hart, Walter W. Junior High School Mathematics. Bk. II. Chapter 7.
5. Barber, Harry C. Junior High School Mathematics. Seventh Year. Chapter 7.
6. Stone, John C. Junior High School Mathematics. Chapters 6 and 7.

IV. DIRECTIONS AND ASSIGNMENTS:

FIRST WEEK:

1. Discuss how to open a bank account, and how to write checks properly. See pp. 225-231, Champion Arithmetics.
2. Read for discussion the subject of "Thrift" from Compton's Pictured Encyclopedia.
3. Select any person who has accumulated a lot of money and be prepared to report to the class on your reading.
4. Study how the clearing house works. See encyclopedia and Champion Arithmetics, p. 231. Make a sketch to show the route of a check through the clearing house.
5. Study the bank statement. Bring statements to class for discussion and comparison.

SECOND WEEK:

1. Begin a budget to run for two weeks time of your own receipts and expenditures. See Stone's Junior High School Mathematics. Bk. I, p. 103.
2. Study p. 236, Champion Arithmetics for class discussion and see also Barber, pp. 175-176. Do the problems in Barber 2-8.
3. Discussions and illustrations on how money grows at compound interest. Make comparisons of compound and simple interest. See Champion Arithmetics, pp. 238-240. Drill work in class.
4. Do the work pp. 177-178 Barber, Problems 5-9.
5. Study Champion Arithmetics, p. 244. Committees to be formed to investigate and report on: Postal Savings Accounts (See Postmaster); registered mail; money orders; method and cost of telegraphing money.

THIRD WEEK:

1. Committee to be formed to investigate and report on the bank draft and the certified check.
2. Study Barber, pp. 180-182, "How Banks Help Us."

3. Installment buying VS. Cash purchases. Study Champion Arithmetics, pp. 251-252. Investigate the topic from other sources. Be able to compare the cost differences in the two plans in buying some specific thing.
4. Work Problems, p. 253, Champion Arithmetics.
5. Test over the unit.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one and complete your work on it before taking the test on the unit.)

1. Plan a yearly budget for a family of five, and with an income of \$1500.
2. Make a dictionary of all new terms studied in this unit.
3. Draw or collect a sample of the business forms used in this unit of work.
4. Make a compound interest table. (See the teacher before selecting this topic.)
5. Show comparative costs of five or six different things purchased for cash and by the deferred payment plan.
6. Write a three-page essay on the subject "Thrift."

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT. Work out this test for yourself before taking the test over the unit.

1. Can you explain the difference between a checking account and a savings account? _____
2. Do you know how to open a checking account? ____; what to do to receive payment on a check or to transfer it to some other person? ____; how to write a check to take money out of your account? ____; how to read a bank statement? ____; how the check travels and is cleared through the clearing house? ____; when and how interest is paid? _____
3. Can you define: cashier ____; deposit slip ____; re-serving teller ____; pass book ____; indorse ____; check-book ____; canceled check ____; and bank statement ____?

4. Can you state several cautions to observe in writing checks? _____
5. Do you know what postal saving certificates are? _____; postal saving stamps? _____; postal savings bonds? _____
6. Do you know the difference between simple interest and compound interest? _____
7. Do you understand these: Regular mail? _____; registered mail? _____; postal money order? _____; bank drafts? _____; telegraphic money order? _____.
8. Do you know what it costs to buy on the deferred payment plan as compared to cash payment?

. # .

THE USE AND CARE OF MONEY: THRIFT

I. A matching test:

- | | | |
|--------------------------------------|--------|--|
| 1. Pass book. | (17) | a check drawn by one bank on its account in another bank |
| 2. Receiving teller. | (5) | an itemized account of moneys presented to a bank for deposit |
| 3. Endorsement. | (4) | paper money |
| 4. Currency. | (10) | savings bonds which may be bought from the local post office or Washington, D. C. |
| 5. Deposit slip. | (7) | a check that has been paid by the bank |
| 6. Check book. | (6) | a booklet of blank forms for writing orders to one's bank to pay sums of money to someone else |
| 7. Canceled check. | (12) | interest paid on interest |
| 8. Bank statement. | (9) | a means by which banks transfer credit without the frequent transfer of money |
| 9. Clearing house. | (2) | a bank employee who accepts money for deposit at the bank |
| 10. Postal saving bonds. | (19) | a way to purchase some things by paying small sums at a stated interval |
| 11. Semi-annual. | (11) | a term meaning every one-half year |
| 12. Compound interest. | (8) | a published report on the financial condition of a bank |
| 13. $I = P \times R \times T$. | (3) | the payee's signature on the back of a check |
| 14. Budget. | (13) | a formula for finding interest |
| 15. Post office money order. | (1) | a booklet for the depositor showing the amounts he puts into the bank and the amounts that he takes from his account |
| 16. Insured parcel post and express. | (15) | a safe means of sending money through the mail |
| 17. Bank draft. | (20) | the exchange of articles for more desirable articles |
| 18. Certified check. | (16) | a safe way to send articles or things too heavy for first-class mail |
| 19. Installment buying plan. | (18) | a kind of check known to be "good" at the time of its presentation |
| 20. Barter. | (14) | an itemized list showing the proposed expenditures of an income |

II. Name five (5) things to always do when writing checks:
(These may be things not to do also.)

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |
| 5. | |

III. Name two (2) differences between a savings account and a checking account:

- 1.
- 2.

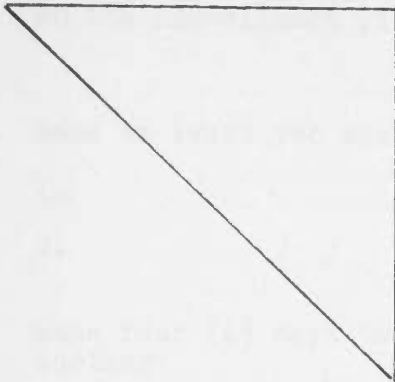
IV. Name three (3) services of banks:

- 1.
- 2.
- 3.

V. Properly fill the check and stub: You have \$23.50 in the bank; you have just purchased a bicycle from the Acme Hardware Co. for \$22.00.

NO. _____ \$ _____ Date _____ 19____ To: _____ For: _____	NO: _____ Playtown, Ks. _____ 19____ <div style="text-align: center;">PLAYTOWN STATE BANK</div> Pay to the order of _____ \$ _____ <div style="text-align: right;">_____ Dollars</div>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Bal. Bro't Forward</td> <td style="width: 20%;"></td> </tr> <tr> <td>Am't Deposited _____</td> <td></td> </tr> <tr> <td>Total _____</td> <td></td> </tr> <tr> <td>Am't of this check: _____</td> <td></td> </tr> <tr> <td>Bal. Carried Forward: _____</td> <td></td> </tr> </table>	Bal. Bro't Forward		Am't Deposited _____		Total _____		Am't of this check: _____		Bal. Carried Forward: _____		<div style="border-top: 1px solid black; height: 10px; width: 100%;"></div>
Bal. Bro't Forward											
Am't Deposited _____											
Total _____											
Am't of this check: _____											
Bal. Carried Forward: _____											

- VI. Show below the proper indorsement of the check written above. (see question V, page II). Jim Brown, a clerk for the Acme Hardware Co., takes the check to the bank for deposit.

	<p>C H E C K F A C E</p>
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- VII. Suppose you take the following money to the bank for deposit: 3 dollar bills, 1 half dollar, 6 quarters, 11 dimes, 12 nickels, 24 cents, and a check for \$5 written by your teacher on the Playtown State Bank. With these facts, fill out the deposit slip below.

Playtown State Bank Deposited by _____			
Playtown, Kansas. _____ 19__			
Currency _____			
Silver _____			
Gold _____			
Checks as follows			
Total \$			
See that all checks and drafts are endorsed.			

VIII. What is the interest on \$50.00 for one year at 6%?

IX. What is a reason for the added cost of an article purchased on the installment plan?

X. Name at least two agencies that encourage thrift:

1.

2.

XI. Name four (4) ways to send money safely from one city to another:

1.

2.

3.

4.

XII. Show the difference between the savings:

\$100.00 @ 4% for four years; interest compounded semi-annually.

\$100.00 @ 4% for four years; simple interest.

I. INTRODUCTION:

Banking is as old as history, although it was once frowned upon because the taking of interest was considered immoral, and some nations forbade their citizens to engage in it. Money-lenders are mentioned in the most ancient Hebrew history. A Roman ordinance of 210 B.C. set aside a place in the Forum for the money-changers who bought and sold foreign coins.

The first real bank notes were issued in 1661 by the Bank of Sweden to eliminate the handling of copper coins.

The first regular bank in the United States was the Bank of North America at Philadelphia, chartered by the Congress of the Confederation in 1782. In 1789, when the Constitution of the United States went into effect, there were only three banks in the country. Most of the people at that time had never seen a bank note, and, in fact, many people were opposed to banks. Today, however, the bank is accepted by the majority of people as a necessary institution.

The modern bank is a complex institution, a financial store, but banking in itself is not a mysterious or secret process. The first purpose of a bank is to accept deposits, or to borrow money from people who do not immediately need it, and lend this money to people who need it for business or personal reasons and are willing to pay interest for the use of it. Perhaps the ordinary worker's interest in banks is centered in the gradually accumulating deposit which he is laying up for himself and his family. Even if banks had no other function more important than this, there would be the very best of reasons for their existence; yet, they could not exist unless they were permitted to be lenders as well as custodians of the funds of others. These and other functions of the banks will be the central theme of this unit.

II. OBJECTIVES:

1. To learn something about the history of banking.
2. To learn about some of the services of modern banks:
 - a. Commercial banks.
 - b. Savings banks.
 - c. Trust companies.
3. To learn about the classification of banks as to their source of authority:
 - a. National banks.
 - b. State banks.
 - c. Private banks.

4. To learn how to draw up and interpret the most common bank forms:
 - a. Travelers' checks.
 - b. The check and stub.
 - c. Deposit slip.
 - d. Statement.
 - e. Bank draft.
 - f. Certified check.
 - g. Letters of credit.
5. To know about the government's responsibility in setting up standards of value.
6. To learn something about the Federal Reserve System.
7. To realize the importance of credit and value to individuals and groups.
8. How to determine the soundness of a bank.
9. To learn how loans are secured from the bank.
10. To learn how to draw up a promissory note.
11. To learn how to figure interest:
 - a. Simple interest.
 - b. Exact interest.
 - c. Compound interest.
12. To learn about interest rates and charges in installment buying.
13. To learn about some of the values of savings accounts.

III. REFERENCES FOR READING AND STUDY:

1. Compton's Pictured Encyclopedia. vol. 2-B. pp. 39-44. 1936 Edition.
2. The World Book. vol. 1-A. pp. 574-580.
3. Compton's Pictured Encyclopedia. vol. 1-A. p. 327. 1926 Edition.
4. Edmonson & Dondineay, Citizenship Through Problems. Chapter XIX.
5. Southworth & Southworth, American History.
6. Beard & Bagley, History of the American People.
7. Hart, Walter W., Junior High School Mathematics. Bk. II. Chapter VII.
8. Brown, J. C. et al. Champion Arithmetics. Bk. III. pp. 225-248; 361-374.
9. Stone, J. C. Junior High School Mathematics. Bk. I. pp. 137-160.
10. Stone, J. C. The Stone Arithmetic. pp. 259-268.
11. Ruch, Knight, Studebaker. Standard Service Work-Book, Gr. 8. pp. 62-73.
12. Barber, Harry G. Junior High School Mathematics. Eighth Year. pp. 49-52; 56-59; 73-78.

IV. DIRECTIONS AND ASSIGNMENTS:

FIRST WEEK:

1. Read to find out about the early history of banks (Written report).
2. Discuss early banking in the United States, and the Federal Reserve System of banking.
3. Discuss the value of credit and how it is established.
4. Read for discussion: Edmonson and Dondineau, Citizenship Through Problems. Chapter XIX.
5. Study Barber, pp. 49-52; pp. 197-200; work problems in Barber, pp. 201-203, Problems 7-13.

SECOND WEEK:

1. Report on the meaning and application of these terms: Checking account; deposit slip; pass book; receiving teller; cashier; check; check stub; bank statement; clearing house; bank draft; travelers' check; postal savings; interest; compound interest; certified check; letters of credit; promissory note; collateral; bank discount; deferred payment; maturity; time; rate; principal; security; judgment; note; sight draft; trade acceptance; proceeds.
2. Bring to class properly drawn check and stub; promissory note; deposit slip; indorsed check; and a bank-cancelled check for study.
3. Study the operation and purpose of the clearing house. Be able to diagram. See Champion Arithmetic, p. 231; Compton's Pictured Encyclopedia, 1936 Edition, p. 42.
4. Study Savings Banks, Barber, p. 203. Explain Table under Problem 16; hand in problems 17-25, pp. 204-205 (Use table for compound interest).
5. Study Champion Arithmetics, pp. 364-365. Work problems, p. 365.

THIRD WEEK:

1. Study Champion Arithmetics, p. 347. See also p. 349 (Exact interest). Study Barber, pp. 73-74. Do problems, p. 74, 4-10.

- 4
2. Study finding time between dates: See Champion Arithmetics, p. 352. Work problems, p. 353. See also, Barber, p. 77. Do Problems 2-10.
 3. Study: How to Pay for a Home, Barber, p. 200; see p. 358, Champion Arithmetics. Do Problems, p. 358-359.
 4. Drill period. Work-Book, p. 62-65; p. 67-70.
 5. Drill period. Work-Book, p. 71-73.

FOURTH WEEK:

1. Stone's Arithmetic, Advanced, p. 261-262. Do all problems.
2. Stone's Arithmetic, Advanced, p. 267-268. Do problems, p. 267, 8-21.
3. Study Stone, Junior High School Mathematics. Bk. I, p. 139. Do problems, p. 139-140.
4. See Barber, p. 252. Work problems in Table III.
5. Champion Arithmetics, p. 366-368. Study carefully. Do problems, p. 369.

FIFTH WEEK:

1. Study p. 370-371 for drill work. Champion Arithmetics.
2. Study p. 372-374. Drill work.
3. General review over the unit.
4. Test over the unit.
5. Test continued.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one. The student's choice of supplementary work is to be completed before tests start over the unit.)

1. Report on the relationship of the Federal Reserve System of banking to the local state banks (see local bankers for added information.)

2. A report on how the post office renders similar services to those of a bank.
3. How can the farmer obtain a loan on his farm or stock through the Federal Land Bank?
4. Investigate and discuss the meaning of "Bankruptcy."
5. The First National Bank of the United States.
6. Barter as a method of exchange.
7. Make a dictionary of new terms learned in connection with the study of this unit.
8. Make a list of the different kinds of banks in the United States and following each list the services rendered.
9. "Wildcat" banks.
10. What happens when banks fail?

VI. TO HELP TEST YOUR KNOWLEDGE OF THE UNIT:

N. B.: The student should not postpone the use of this division until the last week of study on the unit. He should use it from time to time as he progresses through the unit, checking off the questions and statements with which he is familiar.

1. How would you determine the soundness of a bank?
2. Why is it a good plan to pay bills with a check?
3. Banks have always been desirable institutions?
4. Is it difficult to secure a loan from a bank? If so, why?
5. What are the three C's of credit?
6. Can you name banks that perform the services of a commercial bank? Of a savings bank? Of a trust company?
7. Can you name a national bank? A state bank? A private bank?
8. Do you know the chief functions of the Federal Reserve Banks?
9. How many Federal Reserve Banks in the United States? Where is the Federal Reserve Bank that serves this community?
10. Do you know a good definition for: a check; certified check; bank draft; letters of credit; bank statement; discount; pass book; deposit slip?
11. Do you know the purpose of the Federal Farm Loan System?
12. What are the services rendered by the post office that are similar to those of a savings bank?

13. Do you know something about the part played by the government in establishing and controlling banks?
14. Do you know why barter is the simplest method of exchange?
15. Do you realize that money is simply a measure of wealth and is used only as a medium of exchange?
16. Do you know what bankruptcy means?
17. Do you know how to find the interest due on loaned or borrowed money? For a year or more? For a part of a year?
18. Can you find the bank discount when all necessary information is given?
19. Can you explain or discuss the work of the clearing house?
20. Can you draw up a promissory note? Write a check? Recognize a traveler's check?
21. Can you use the interest formula?
22. Can you discuss the advantages and disadvantages of installment or deferred buying?
23. Can you find the savings that would accrue from a savings account?
24. Do you know what compound interest is and how to find it?
25. Can you use an interest table?
26. Do you know how money is lost by hoarding?
27. Do you know what is meant by: Security; collateral; proceeds; trade acceptance?
28. Can you find the time between dates?
29. Do you know why it cost to give credit?
30. Why is no interest usually paid on checking accounts?
31. How large a sum may one depositor have to his credit?
32. What is the smallest sum that may be deposited in a postal savings bank?
33. Where are the Federal Reserve Banks located?
34. May a bank safely loan all of its capital? All of its deposits? Why?
35. Why is it absolutely necessary that banks be lenders as well as custodians of funds?

I. A matching test:

- | | |
|------------------------|---|
| 1. Collateral. | (11) interest paid on interest |
| 2. Pass book. | (3) a written order to a bank to pay a sum of money |
| (11) 3. Check. | (7) money paid for the use of money |
| 4. Bank statement. | (10) the signing of one's name on the back of a check |
| 5. Bank draft. | (5) a check drawn by one bank on its account in another bank |
| 6. Traveler's cheques. | (1) stocks and bonds pledged or given to the bank to hold in order to secure a loan |
| 7. Interest. | (2) a book in which are kept the accounts of one's deposits and checks |
| 8. Certified check. | (4) a published list of assets and liabilities of a bank |
| 9. Canceled check. | (6) a safe and convenient way of carrying money |
| 10. Endorsement. | (9) a check that has been paid by the bank |
| 11. Compound interest. | (8) a kind of check issued by the bank which carries a statement that it is good for the amount given |

II. (5) Fill out the check below:

NO. <u>3</u> \$ <u>15⁰⁰</u> Date <u>Oct. 30, 1938</u> To: <u>Jim Edwards</u> For: <u>Bicycle</u>	NO: <u>3</u> Playtown, Ks. <u>Oct. 30, 1938</u> PLAYTOWN STATE BANK Pay to the order of <u>Jim Edwards</u> \$ <u>15⁰⁰</u> <u>Fifteen and no/100</u> Dollars										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 80%;">Bal. Bro't Forward</td> <td style="width: 20%; text-align: right;">12 00</td> </tr> <tr> <td>Am't Deposited</td> <td style="text-align: right;">6 50</td> </tr> <tr> <td>Total</td> <td style="text-align: right;">18 50</td> </tr> <tr> <td>Am't of this check:</td> <td style="text-align: right;">15 00</td> </tr> <tr> <td>Bal. Carr'd Forward:</td> <td style="text-align: right;">3 50</td> </tr> </tbody> </table>	Bal. Bro't Forward	12 00	Am't Deposited	6 50	Total	18 50	Am't of this check:	15 00	Bal. Carr'd Forward:	3 50	<div style="display: flex; justify-content: space-around; align-items: center;"> x x </div>
Bal. Bro't Forward	12 00										
Am't Deposited	6 50										
Total	18 50										
Am't of this check:	15 00										
Bal. Carr'd Forward:	3 50										

You have \$12.00 in the bank and deposit \$6.50 more before buying a bicycle from Jim Edwards for \$15.00. Use the current date.

III. Give the classification of banks as to the kind of services they render:

⑥

1. *Commercial* 2. *Savings* 3. *Trust*

Give the classification of banks according to their source of authority:

1. *National* 2. *State* 3. *Private*

IV. What Federal Reserve district do we live in? _____

V. Write correctly a promissory note:

⑩

\$15.00	Mackeville, Kansas	Oct. 30, 1937.
Three months after date I promise to		
pay to the order of <u>Wm. Linville</u>		
Fifteen and ^{no} / ₁₀₀ ————— Dollars with interest at		
6%.		
For value received	<u>X</u>	<u>X</u>

VI. State the interest formula: $I = Prt$

⑤

VII. Name at least two things which will help a person to borrow money at his bank:

③

1. *Good reputation as to character and business ability.*
2. *Friends with financial standing.*
3. *Salable stocks or bonds.*

②

VIII. What number of days are there from June 14 to September 3? 80

IX. Find the interest on \$1800 for 60 days at 4%: \$12.00

⑤

X. The cash price on a bicycle is \$32. It can be purchased by paying \$8 down and \$4 per month for 7 months. What rate of interest is charged for deferred payment? 12 1/2%

⑤

I. INTRODUCTION:

How to judge a good investment is a very important part of one's education. When one has money to invest, there are usually salesmen trying to persuade him to invest it in some enterprise; and the investor should know whether it is safe, or merely some speculative scheme in which he is liable to lose all the money he puts into it.

II. OBJECTIVES:

1. To learn some facts about how to judge a good investment.
2. To learn some ways which one might use to detect fraudulent or speculative schemes.
3. To learn the meaning of bonds, and to know some of the uses of them:
 - a. Coupon bonds.
 - b. Registered bonds.
 - c. Serial bonds.
 - d. Municipal bonds.
 - e. State bonds.
 - f. Federal or "Government" bonds.
 - g. Corporation bonds.
4. To learn something about stocks as investments:
 - a. Common stock.
 - b. Preferred stock.
 - c. Safety.
 - d. Yield.
 - e. Market.
5. To compare stocks and bonds as investments.
6. To learn how stocks and bonds are bought and sold.
7. To learn how to buy a home:
 - a. Mortgage.
 - b. Monthly payments.
 - c. Renting and owning.
 - d. Building and loan.
8. To become familiar with some of the terms used in discussing stocks and bonds.

III. REFERENCES FOR READING AND STUDY:

1. Compton's Pictured Encyclopedia. vol. 13, p. 290.
2. Brown, J. C. Champion Arithmetics. Bk. III, pp. 376-403.
3. Barber, Harry C. Junior High School Mathematics, Eighth Year. pp. 205-210.
4. Stone, John C. The Stone Arithmetic, Advanced. Chapter XI, p. 269.
5. Hart, Walter W. Junior High School Mathematics. Bk. II, Chapter VIII, p. 115.

6. The World Book. vol. 9, pp. 5554-5556. Also, vol. 2, pp. 807-808.
7. Daily newspapers.

IV. DIRECTIONS AND ASSIGNMENTS:

FIRST WEEK:

1. Read to find the meaning of the following: Stock; bond; stock company; par value; dividends; common stock; preferred stock; lein; registered bond; serial bond; stockholder; stock exchange (see Compton's Encyclopedia).
2. Read for discussion: Brown's Champion Arithmetics, pp. 376 ("Problems") to 379.
3. Work problems, Champion Arithmetics, p. 379.
4. Learn how stocks are bought and sold: See Champion Arithmetics, pp. 380-381; Hart, pp. 134-136; also, Stone, pp. 277-283.
5. Do problems, Barber, pp. 206-207. Problems 3-21.

SECOND WEEK:

1. Review and drill - Do also problems, Stone Advanced Arithmetic, pp. 285-286. Problems 1-13.
2. Do Problems, Champion Arithmetics, p. 382.
3. Do Problems, Champion Arithmetics, p. 383.
4. Do Problems, Champion Arithmetics, pp. 384-385.
5. Study for discussion: Champion Arithmetics, pp. 387-388; Hart, pp. 115-117; also, Stone, pp. 269-270.

THIRD WEEK:

1. See Champion Arithmetics, pp. 389-390. Do Problems 1-15, p. 391.
2. Do Problems 1-8, Champion Arithmetics, p. 392.
3. Study for discussion, pp. 393-395, Champion Arithmetics. Be able to complete blanks, p. 393. Bring a daily newspaper to class.
4. Study pp. 397-399, Champion Arithmetics. Do work p. 400.
5. Answer questions on paper. Champion Arithmetics, pp. 401-402.

FOURTH WEEK:

1. Study p. 403, Champion Arithmetics. Discuss in class.
2. See Hart, pp. 126-128. Do Problems 1-10.
3. Review and drill. Supplementary.
4. Test.
5. Test.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one. This work must be completed and checked in to the teacher before testing is started on the unit.)

1. Write a paper on "Why Stocks Vary in Value."
2. Define 25 terms found in the discussion and study of stocks and bonds.
3. Show by chart the fluctuation of the value or selling price of some stock (selected from the daily paper) for a period of three weeks.
4. Write a paper on "Factors to Consider in Buying Bonds."
5. Show by comparative problems "The Best Way to Buy a Home."
6. Organize a "Play" Stock Company from the class.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT:

(The student should not postpone the use of this division of the unit until the last week of study. He should use it from time to time as he progresses through the unit, checking off the questions and statements that he becomes familiar with.)

1. Can you define the following? Share of stock___; par value___; capital stock___; stockholder___; stock certificate___; surplus fund___; dividend___; above and below par___; corporation___; charter___; board of directors___; preferred stock___; common stock___; stock exchange___; broker___; brokerage___; bond___; face value___; date of maturity___; mortgage bonds___; coupon bonds___; registered bonds___; Federal, State, and Municipal Bonds___; yield to maturity___; mortgage___; foreclosure of mortgage___; building and loan association___; depreciation___.

2. Can you complete these statements?
- a. The _____ paid on a bond does not change from year to year.
 - b. Some _____ are assessable, but no _____ are assessable.
 - c. Interest on bonds _____ paid whether corporation makes a profit or not.
 - d. The rate of dividend on the common stock of a company making large profits is likely to be _____ than the rate of interest on the company's bonds.
 - e. The income on bonds is _____ certain than the income on stocks.
 - f. If a business fails, the _____ holders have the first claim on the property.
 - g. Usually _____ are subject to greater changes in price than are _____.
3. Can you explain how a building and loan association operates? _____
4. Do you know how to buy bonds or stocks? _____
5. To whom do you go seeking advice before investing money? _____
6. Do you know how to get the comparative value or business standing of a company? _____
7. Can you show that any one method of buying a home is superior to another? _____
8. Do you know what the Better Business Bureau is? _____ Its purpose? _____
9. Can you read the stock quotations from the newspapers? _____
10. Do you know what speculation is, and its risks? _____

INVESTMENTS

I. A matching test:

- | | |
|-----------------------------|--|
| (15) 1. Par value. | (12) a kind of stock which has a fixed rate of dividend, and the owner usually has voting privileges |
| 2. Stockholders. | (7) a member of the stock exchange who deals in certain stocks and who charges a commission for buying and selling |
| 3. Stock certificate. | (6) a group of stockholders in a company who are elected by their business associates to conduct it |
| 4. Capital stock. | (15) a certificate from the state providing certain privileges and regulations for the company or corporation |
| 5. Dividend. | (13) the commission charged by a broker for doing business for someone else |
| 6. Board of Directors. | (1) the stated value of stock per share |
| 7. Broker. | (2) owners of the stock of a company |
| 8. Bonds. | (8) a kind of promissory note usually issued by governmental divisions or corporations for borrowing money |
| 9. Mortgage. | (10) the net income in per cent on an investment....stocks and bonds |
| 10. Yield on Stock or Bond. | (14) the business of buying and selling stocks and bonds, the place of |
| 11. Common stock. | (4) the amount of money, received from the sale of stock, which the company uses as a basis for doing business |
| 12. Preferred stock. | (11) a kind of stock whose income varies and whose owners usually have no votes in the affairs of the company |
| 13. Brokerage. | (3) a certificate showing ownership of stock |
| 14. Stock exchange. | (9) a pledge of property to guarantee the payment of money borrowed |
| 15. Charter. | (5) the payment of profits on stocks to their owners...the money paid |

II. Complete these statements with the best word or words:

- (12) 1. The rate of interest paid on a bond does not change from year to year.
2. Some stocks are assessable but no bonds are assessable.
3. The interest on bonds is paid whether the corporation makes a profit or not.

4. The income on bonds is more certain than the income on stocks.
5. If a business fails, the stockholders have the first claim on the property.
6. Usually stocks are subject to greater changes in price than are bonds.

III. What are three factors to consider in buying stocks or bonds?

(3)

1. Safety
2. Marketability
3. Yield

IV. Name at least two agencies to whom you would go for advice on the buying of stocks or bonds:

(2)

1. Banks
2. Better Business Bureaus

V. If you were to buy 60 shares of stock at \$50 par value which paid $5\frac{1}{2}\%$ dividends the first year, what would be the income?

(5)

$$\$50 \times 60 = \$3000 \times 5\frac{1}{2}\% = \$165$$

VI. What would be the cost of 10 shares of stock, par value \$100, at $91\frac{1}{4}\%$?

(5)

$$\$100 \times 10 = \$1000 \times .9125 = \$912.50$$

VII. If I were to buy 10 shares of $5\frac{1}{2}\%$ stock, \$100 par value, for 87, what rate would I receive on the investment?

(5)

$$\begin{array}{r} \$100 \times 10 = \$1000 \\ - 870 \text{ cost} \\ \hline \$130 \end{array}$$

$$\begin{array}{r} \$1000 \times 5\frac{1}{2}\% = \$55 \text{ income} \\ \$55 \div \$870 = 6.3\% \end{array}$$

VIII. A man bought a 6% bond at 90 in 1932. This bond will mature in 1947. What will be the yield to maturity on this investment?

(5)

$$\begin{array}{r} \$1000 \\ 900 \\ \hline \$100 \text{ profit on} \\ \text{first buy} \end{array}$$

$$\begin{array}{r} \$1000 \\ .06 - \text{rate} \\ \hline \$60.00 = \text{Int. pay.} \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 1947 \\ - 1932 \\ \hline 15 \text{ yrs.} \end{array}$$

$$\$900 + \$100 = \$1000 \div 15 \text{ yrs.} = 66.67 \div 900 =$$

$$7.4\% \text{ yield}$$

- IX. (5) Mr. X bought a house and lot for \$8500. He paid \$3000 cash and agreed to pay \$500 every six months, in addition to the interest due at each payment at the rate of 6% per year. Compute the interest payment and the balance due at the end of 6 months; 18 months.

$$\begin{array}{r}
 \$8500 \\
 \underline{3000} \\
 \$3500 \text{ due} \\
 \times .06 \text{ rate} \\
 \hline
 \$330 \text{ Int.} + \$500 = \$830 \\
 \text{1st payment} \\
 \hline
 \$5000 \text{ due}
 \end{array}$$

$$\begin{array}{r}
 \$5000 \text{ due} \\
 \times .06 \text{ rate} \\
 \hline
 \$300.00 \text{ Int.} \\
 \hline
 500 \text{ payment} \\
 \hline
 \$800 \text{ payment Total} \\
 \hline
 \$4500 \text{ due}
 \end{array}$$

$$\begin{array}{r}
 \$4500 \text{ due} \\
 \times .06 \text{ rate} \\
 \hline
 \$270.00 \text{ Int.}
 \end{array}$$

- X. (5) A boys' club bought a cabin for \$460, paid \$100 in cash, and agreed to make monthly payments of \$30 in addition to the interest due at the rate of 6% per year. How long will it take the boys to pay for the cabin? Find each monthly payment and the total interest paid.

$$\$460 - \$100 = \$360 \text{ still due}$$

<u>Month</u>	<u>Payment</u>	<u>Interest</u>	<u>Total Payment</u>
1.	\$30	\$1.80	\$31.80
2.	30	1.65	31.65
3.	30	1.50	31.50
4.	30	1.35	31.35
5.	30	1.20	31.20
6.	30	1.05	31.05
7.	30	.90	30.90
8.	30	.75	30.75
9.	30	.60	30.60
10.	30	.45	30.45
11.	30	.30	30.30
12.	30	.15	30.15

UNIT III

I. INTRODUCTION:

Insurance is a plan by which a great many people pay a small amount of money each, in order that the few of them who suffer loss may be repaid. There are, of course, many kinds of insurance; usually, however, when insurance is mentioned, many of us think either of fire insurance or life insurance. But the loss of life and the destruction of property by fire are not the only ways in which losses occur. For instance, one's automobile may be insured against loss by theft. This is called casualty insurance. Then, one who operates an automobile or some kind of dangerous machinery might carry liability insurance, which protects the injured against damages in case his car or machinery injures some other person or person's property.

In this unit of study, we propose to make a short study of the most common kinds of insurance. It is interesting to note that the people of the United States spend about \$2,200,000,000 annually for education; about \$3,000,000,000 for automobiles; and about \$3,500,000,000 for life insurance.

II. OBJECTIVES:

1. To learn the meaning and purpose of property insurance:
 - a. Fire.
 - b. Casualty.
 - c. Liability.
 - (1) Workmen's compensation.
 - d. Co-insurance.
2. To learn some of the common facts about the kinds of life insurance.
 - a. Ordinary.
 - b. Limited payment, as 20-payment life.
 - c. Endowment.
 - d. Child endowment insurance.
 - e. Life annuity.
 - f. Term insurance.
 - g. Accident.
 - h. Health.
 - i. Group insurance.
3. To learn the meaning and proper use of common insurance forms:
 - a. Policy.
 - b. Face.
 - c. Term of policy.
 - d. Premium.
 - e. Beneficiary.
 - f. Claims.
 - g. Life expectancy.
 - h. Rate.
 - i. Loan or cash-surrender value.
 - j. Paid up insurance.

- k. Mortality.
- l. Inventory.
- m. Adjuster.
- n. Distribution of loss.
- 4. To learn how life insurance is paid:
 - a. Double indemnity.
 - b. Lump sum.
 - c. Life income.
 - d. Survivorship annuity.
- 5. To learn about some of the factors which affect the cost of issuance of insurance.
 - A. Fire Insurance:
 - 1. Location of building.
 - 2. Material of which the building is made.
 - 3. Use made of the building.
 - 4. Use, location, and construction of other buildings in the vicinity.
 - B. Life Insurance:
 - 1. Age.
 - 2. State or condition of health.
 - 3. Occupation.
- 6. To learn how to solve the most common problems of insurance.
 - 1. Finding premiums.
 - 2. Comparing premiums.
 - 3. Computing rates for comparisons.
- 7. To learn about the advisability of insurance, and something about the kinds that fit the situations and conditions best.
- 8. To learn something about how an insurance company operates.
 - 1. Use of statistics.
 - 2. Study of diseases.
 - 3. Health education.
 - 4. Reserve funds.
 - 5. Investments.
 - 6. State supervision of insurance.

III. REFERENCES FOR READING AND STUDY:

- 1. Compton's Pictured Encyclopedia; vol. 7, I-J, pp. 94-96.
- 2. The World Book. vol. 5, G-K, pp. 3004-3007.
- 3. Brown, Joseph C. et al. Champion Arithmetics. Bk. III, pp. 404-417.
- 4. Stone, John C. The Stone Arithmetic, Advanced. Chapter XII, p. 292.
- 5. Barber, Harry C. Junior High School Mathematics, 8th Yr. pp. 69-73.
- 6. Hart, Walter W. Junior High School Mathematics. Bk. II, Chapter V, p. 62.

IV. DIRECTIONS AND ASSIGNMENTS:

FIRST WEEK:

1. Discuss the purpose of insurance. Discuss how it is possible for insurance companies to operate. Why does the state require the right to supervise? See Champion Arithmetics, p. 404; also, p. 416; Hart, Chapter V; and general references.
2. Learn how to use the terms common to fire insurance policies. See Barber, p. 69, for study. Do problems Champion Arithmetics, p. 406.
3. Do the problems concerned with finding the cost of property insurance in Barber, p. 70, 5-38. Study Stone Advanced Arithmetic, p. 295, for factors influencing premiums.
4. Casualty Insurance; Liability Insurance; and Workmen's Compensation. Work Problems, p. 409, Champion Arithmetics.
5. Review and test on insurance terms and problems already studied.

SECOND WEEK:

1. Life Insurance--Kinds. Study pp. 411-414, Champion Arithmetics; Barber, p. 72. Insurance terms and kinds.
2. Work problems in Champion Arithmetics, p. 415.
3. Work problems, p. 72, Barber.
4. Class to interview local insurance men on Insurance--Terms, Kinds, etc.
5. Test on the unit.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one and complete it before taking the test on the unit.)

1. Write 250 words, "Why Business Men Carry Insurance."
2. Report, either orally or written, "Some Methods of Fire Prevention."
3. Report on local insurance rates, and why they vary.

4. Report on local city ordinances relative to fire insurance.
5. List as many kinds of insurance as you can learn about and discuss them briefly.
6. Discuss unusual insurance policies, as the insurance of fingers or toes or wrists of pianists, dancers, and violinists, respectively.
7. Write on, "How or Why Insurance is an Investment."
8. Discuss the history of Marine Insurance.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT:

1. Can you define these? Policy___; inventory___; face of policy___; adjuster___; premium___; distribution of loss___; term of policy___; beneficiary___; face ___; insurance___; casualty insurance___; liability ___; workmen's compensation___; life annuity___; life expectancy___; mortality costs___.
2. Can you explain the chief differences in ordinary life, limited-payment life, endowment, and term insurance?
3. Do you know what is meant by co-insurance?
4. Can you explain group insurance?
5. What is double indemnity?
6. Do you know what is meant by cash or loan surrender value?
7. What is paid-up insurance?
8. Can you name several factors which affect the insurance rates?
9. Can you find the annual premium on a given policy when all necessary information is known?
10. Can you give a reasonable answer to why about one-half the people in the United States are insured?
11. Do you know the basis for charging by insurance companies?
12. Do you know why insurance companies are interested in Health and Safety Education?

I. Match the terms in Column A with the meanings in Column B:

- | A | B |
|------------------------------|---|
| 1. Policy. | () a list of items insured |
| 2. Face of policy. | () the amount the company agrees to pay in the case of total loss |
| 3. Premium. | () to spread the loss over many policy holders so that no one has to stand it all |
| 4. Term of policy. | () the printed agreement between the company and the insured |
| 5. Inventory. | () the amount which the insured pays for his insurance |
| 6. Adjuster. | () the period of time during which the property is insured |
| 7. Distribute the loss. | () the representative of the company who, in the case of loss, bargains with the insured as to the amount to be paid by the company |
| 8. Insurance. | () a plan by which a great many people pay a small amount each, in order that the few of them who suffer loss may be repaid |
| 9. Endowment. | () the person to whom the insurance money is to be paid |
| 10. Life annuity. | () the number of years and months that the average person may be expected to live |
| 11. Loan or surrender value. | () statements of loss of insured property |
| 12. Double indemnity. | () a kind of insurance which becomes a kind of investment, the face being payable after a number of stated payments have been made |
| 13. Beneficiary. | () an insurance plan chiefly for elderly persons who may invest their money and receive a guarantee of a certain annual income for the remainder of life |
| 14. Term insurance. | () the cost of deaths to insurance companies |
| 15. Group insurance. | () the money that can be had as a loan upon face of a policy or the amount of paid up insurance for no further payment of premiums |
| 16. Life expectancy. | () an insurance which is in force for short periods of time |
| 17. Health insurance. | () twice the amount of the face of the policy paid for accidental death or injury |
| 18. Mortality cost. | () insurance carried by employers on their workers to guard against losses from death, sickness, and accidents while at work |
| 19. Paid up insurance. | () a kind of insurance to protect one chiefly against loss of time from work because of illness |
| 20. Claims. | () the payment of all premiums necessary to meet the agreement of the policy. |

II. State briefly the purpose of these kinds of insurance:

1. Fire -
2. Casualty -
3. Liability -
4. Life -
5. Workmen's compensation -

III. Make clear in more than one way differences between ordinary life insurance and limited payment life insurance, such as 20-payment life.

IV. Name three ways in which life insurance may be paid.

V. Name four factors which affect the insurance rates on property.

VI. Name three factors which influence the issuance and premiums of life insurance.

VII. A factory worth \$75,000 is insured for 90% of its value at \$0.64 per \$100. The machinery and other contents are insured for their full value of \$54,000 at \$0.72 per \$100. After a short time the factory and machinery are completely destroyed by fire. Find the loss to the insurance company. Find the net loss to the owner.

VIII. My house is insured for \$7,500. How much will I save in premiums in ten years by taking out a new policy each 5 years at \$1.28 per \$100, instead of each year at \$0.32 per \$100?

IX. A man paid \$2,000 for a truck to use in his business. He insured it for $\frac{4}{5}$ of its value. The insurance company charged \$0.35 a \$100 for insuring it against fire. How much did the insurance cost? How much would the insurance company have to pay if the truck was destroyed by fire?

- X. Mr. James took out a 20-year endowment policy for \$5,000 at the age of 50. The rate was \$50.50 per \$1,000. If he lived to be 70, how much would he have paid in premiums to the insurance company? If he had taken out the policy at the age of 40, the rate would have been \$44.40 per \$1,000. How much less would he have paid in 20 years?

I. INTRODUCTION:

Almost all people meet with the necessity of knowing how to find the contents or the square surface in such geometric solids as the rectangle solid, prisms, cylinders, pyramids and cones, and the sphere. These figures are about us in our homes and in our work. Mechanics, and the engineers, architects, and contractors who plan their work for them, must be able to measure and to construct many solid geometry figures, as well as the plane geometry figures that we have learned about. As you will remember, plane geometry figures are all flat, having only length and width. But solid geometry figures have three dimensions, length, width, and height or thickness.

II. OBJECTIVES:

1. To learn how to sketch the geometric solids named in the Introduction.
2. To learn how to find the square surface area and cubic contents of rectangular solids.
3. To learn about some of the different kinds of prisms, and how to find their surface and their volume.
4. To learn how to find the volume and the lateral surface area of cylinders.
5. To learn how the volume of pyramids and cones compare; and how to find their volumes and surface.
6. To learn what is meant by vertex, slant, height, and altitude in the cone and pyramid.
7. To learn how to compute the volume of the sphere and how to find its surface area.

III. REFERENCES FOR READING AND STUDY:

1. Brown, Joseph C. et al. Champion Arithmetics. Bk. III, pp. 462-482.
2. Hart, William H. Junior High School Mathematics. Bk. II.
3. Barber, Harry C. Junior High School Mathematics. Eighth Year, pp. 160-169.
4. Stone, John C. The Stone Arithmetic, Advanced. pp. 214-222.
5. Compton's Pictured Encyclopedia. "Geometry".

IV. DIRECTIONS AND ASSIGNMENTS:

FIRST WEEK:

1. Discuss and illustrate the meaning of volume or capacity. Mention things that have volume. Attempt to sketch representative figures having volume. Indicate the measurements necessary to compute volume.
2. Measure six rectangular solids found about the school building and compute their volume. Try to develop a formula which may be used in finding the volume of a rectangular solid. Report the surface area of the figures you measured. These figures are sometimes called parallelpipeds.
3. Do the problems on p. 463, Champion Arithmetics.
4. Read p. 468, Champion Arithmetics. Sketch three kinds of prisms, give them dimensions; compute their surface area, and find their volume.
5. Study "The Surface of a Cylinder," p. 217, The Stone Arithmetic, Advanced. Solve Problems 3-9.

SECOND WEEK:

1. Volume of cylinders. Drill on finding volumes with formula V is $\pi r^2 h$. Do problems from Barber, p. 162, Problems 20-26, inclusive.
2. Make the necessary measurements and compute the volume of and the lateral area of the barrel-like drum used as an incinerator in the back yard. In class, drill on volume of cylinders.
3. Make models of cones and pyramids to correspond to cylinders and rectangular solids of same dimensions in base area and altitude. Compare volumes by demonstration, using models, the cone with the cylinder and the pyramid with the rectangular solid. See Stone, Advanced Arithmetic, p. 218, or the Champion Arithmetics, p. 476.
4. Study the meaning of "Slant Height". See Champion Arithmetics, pp. 477-478, or Hart's Junior High School Mathematics, p. 164.
5. Develop formula for volume and surface area of the sphere. Demonstrate with models. See pp. 480-490, Champion Arithmetics. For Volume demonstration, see Barber, p. 168.

THIRD WEEK:

1. Drill on Sphere problems. Do work in Champion Arithmetics, p. 482.
2. General comparative examples of work in the unit. Review formulas and demonstrate their use. See Champion Arithmetics, p. 483.
3. Test: All work in the unit.

V. SUPPLEMENTARY WORK:

THINGS TO DO AND TOPICS TO INVESTIGATE: (Choose one and complete your work on it before taking the test on the unit.)

1. Make 3" or 4" models from soap, wood, or paper of the geometric solids studied.
2. Name five uses of each figure studied, that is, practical applications, as the parts of machines.
3. Write a 2-page paper on early geometry.
4. Illustrate the use of all formulas studied in this unit. State the formula, sketch the figure to which it applies, supply dimensions and solve.

VI. TO HELP YOU TEST YOUR KNOWLEDGE OF THE UNIT:

(Complete this matching test before time to take the test over the unit.)

- | | |
|--|-----------------------------------|
| 1. $4\pi r^2$ | _____ lateral area of prism |
| 2. $b a$ | _____ diameter of circle |
| 3. $2\pi r h$ | _____ lateral area of pyramid |
| 4. perimeter of base
times height | _____ volume of prism |
| 5. $4/3\pi r^3$ | _____ surface area of sphere |
| 6. $\frac{1}{2}$ circumference
times slant height | _____ volume of pyramid |
| 7. $\pi r^2 h$ | _____ lateral area of cone |
| 8. $\frac{1}{2}$ perimeter of base
times slant height | _____ area inclosed by circle |
| 9. $2\pi r$ | _____ area inclosed by rectangle |
| 10. $1/3 b h$ | _____ volume of sphere |
| 11. $l w h$ | _____ radius of circle |
| 12. $\frac{1}{2} b a$ | _____ lateral area of cylinder |
| 13. $l w$ | _____ surface area of hemisphere |
| 14. $b h$ | _____ volume of rectangular solid |
| 15. $C/2\pi$ | _____ area inclosed by trapezoid |
- (see next page)

VI. (Problem continued, see p. 3 of test.)

$$16. \pi r^2$$

$$17. \frac{a(b_1 + b_2)}{2}$$

$$18. 2\pi r^2$$

$$19. C/\pi$$

$$20. \frac{1}{3} \pi r^2 h$$

- _____ volume of cone
- _____ circumference of circle
- _____ area inclosed by triangle
- _____ volume of cylinder
- _____ area inclosed by parallelogram

I. A matching test:

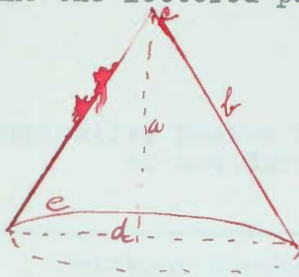
- | | |
|--|--------------------------------------|
| (20) 1. $4\pi R^2$ | (4) lateral area of prism |
| 2. $b a$ | (19) diameter of circle |
| 3. $2\pi R h$ | (8) lateral area of pyramid |
| 4. Perimeter of base
x height | (14) volume of a prism |
| 5. $4/3\pi r^3$ | (1) surface area of a sphere |
| 6. $\frac{1}{2} C \times$ slant height | (10) volume of a pyramid |
| 7. $\pi r^2 h$ | (6) lateral area of cone |
| 8. $\frac{1}{2}$ perimeter of base
x slant height | (16) area inclosed by circle |
| 9. $2\pi r$ | (13) area inclosed by rectangle |
| 10. $1/3 b h$ | (5) volume of a sphere |
| 11. $l w h$ | (15) radius of a circle |
| 12. $\frac{1}{2} b a$ | (3) lateral area of a cylinder |
| 13. $l w$ | (18) surface area of a hemisphere |
| 14. $b h$ | (11) volume of a rectangular solid |
| 15. $C/2\pi$ | (17) area inclosed by a trapezoid |
| 16. $r\pi^2$ | (20) volume of a cone |
| 17. $\frac{a(b_1 + b_2)}{2}$ | (9) circumference of a circle |
| 18. $2\pi r^2$ | (12) area inclosed by a triangle |
| 19. C/π | (7) volume of a cylinder |
| 20. $1/3\pi r^2 h$ | (2) area inclosed by a parallelogram |

II. A swimming tank 80 ft. long and 32 ft. wide is filled to an average depth of 5 ft. How many gallons of water does it contain? 1706.6 + gal.

(5)

III. Name the lettered parts in this figure:

(5)



a = altitude

b = slant height

c = vertex

d = diameter

e = circumference

IV. Find the volume of a triangular prism whose base is $9'' \times 16''$ and whose height is $14''$.

(5)

378 cu. in.

V. What is the lateral area of a cylinder with a $3''$ radius and a height of $8''$?

(5)

150.72 sq. in.

VI. Find the volume of a cone with a radius of $8''$ and a height of $18''$.

(5)

1205.76 cu. in.

VII. What would be the volume of a $4''$ sphere?

(5)

267.94 cu. in.

VIII. The perimeter of a pyramid is 48 inches. It has a slant height of 16 inches. What is its lateral area?

(5)

345.6 sq. in.

IX. What is the surface area of a sphere with a 3 ft. radius?

(5)

113.04 sq. ft.

X. What part of a cylinder is a cone with like dimensions?

(1)

$\frac{1}{3}$

TABLE XV

Comparative Scores Made by the Eighth Grade Pupils on Unit I
of the Experiment. Unit Subject: Banking.

Textbook Students Group A	Score	Experiment Students Group B	Score
June Wilson	28	Carmen Hardie	46
Calvin Fuqua	18	Bernice Breneman	34
Dale Graebner	21	Opal Stimatze	41
Barbara Holland	19	Betty Jo Cotton	30
Lenore Foley	18	Wanda Lee Kearns	25
Betty Munde	17	Jackie Pifer	20
Ruth DeBusk	21	Kenneth Becker	19
Vernie Hall	18	Leroy Bartlett	13
Total	160	Total	228
Group Difference in Total Scores is 68			

TABLE XVI

Comparative Scores Made by the Eighth Grade Pupils on Unit II
of the Experiment. Unit Subject: Investments.

Textbook Students Group B	Score	Experiment Students Group A	Score
Carmen Hardie	35	June Wilson	26
Bernice Breneman	24	Calvin Fuqua	21
Opal Stimatze	25	Dale Graebner	28
Betty Jo Cotton	20	Barbara Holland	15
Wanda Lee Kearns	14	Lenore Foley	18
Jackie Pifer		Betty Mundee*	
Kenneth Becker	15	Ruth DeBusk	24
Leroy Bartlett	10	Vernie Hall	23
Total	143	Total	155
Group Difference in Total Scores is 12			

* This girl left school before this unit was completed.

TABLE XVII

Comparative Scores Made by the Eighth Grade Pupils on Unit III of the Experiment. Unit Subject: Fire and Life Insurance.

Textbook Students Group A	Score	Experiment Students Group B	Score
June Wilson	33	Carmen Hardie	50
Calvin Fuqua	33	Bernice Breneman	46
Dale Graebner	26	Opal Stimatze	39
Barbara Holland		Betty Jo Cotton*	
Lenore Foley	20	Wanda Lee Kearns	27
Ruth DeBusk	25	Kenneth Becker	22
Vernie Hall	17	Leroy Bartlett	10
Total	154	Total	194
Group Difference in Total Scores is 40			

* This girl was absent too much of the time during this unit of work to make a fair test score.

TABLE XVIII

Comparative Scores Made by the Eighth Grade Pupils on Unit IV of the Experiment. Unit Subject: Surface Area and Volume of Geometric Solids.

Textbook Students Group B	Score	Experiment Students Group A	Score
Carmen Hardie	47	June Wilson	43
Bernice Breneman	29	Calvin Fuqua	27
Opal Stimatze	19	Dale Graebner	28
Betty Jo Cotton	19	Barbara Holland	27
Wanda Lee Kearns*		Lenore Foley	
Kenneth Becker	15	Ruth DeBusk	13
Leroy Bartlett**		Vernie Hall	
Total	129	Total	138
Group Difference in Total Scores is 9			

* This girl was absent from school too much during the time of this unit to make a fair test grade.

** This boy left school before the unit was completed.

TABLE XIX

Comparative Scores Made by the Seventh Grade Pupils on Unit I
of the Experiment. Unit Subject: Percentage.

Textbook Students Group A	Score	Experiment Students Group B	Score
Dean Heckel	15	Dorothy DeGarmo	25
Evelyn McMillan	10	Joe Starke	25
Janet Pifer	14	Raye D. Foss	16
Robert Denbo	13	Bill Wilson	6
Merritt Hardie	14	Delma Rader	22
Alton Neil, Jr.	5	Wayne Eddingfield	15
Total	71	Total	109
Group Difference in Total Scores is 38			

TABLE XX

Comparative Scores Made by the Seventh Grade Pupils on Unit II of the Experiment. Unit Subject: Some Applications of Percentage.

Textbook Students Group B	Score	Experiment Students Group A	Score
Dorothy DeGarmo	14	Dean Heckel	14
Joe Starke	17	Evelyn McMillan	13
Raye D. Foss	17	Janet Pifer	17
Bill Wilson	7	Robert Denbo	13
Delma Rader	16	Merritt Hardie	18
Wayne Eddingfield	4	Alton Neil, Jr.	11
Total	75	Total	86
Group Difference in Total Scores is 11			

TABLE XXI

Comparative Scores Made by the Seventh Grade Pupils on Unit III of the Experiment. Unit Subject: Some Geometric Figures and Constructions.

Textbook Students Group A	Score	Experiment Students Group B	Score
Dean Heckel*		Dorothy DeGarmo*	
Evelyn McMillan	18	Joe Starke	21
Janet Pifer	15	Raye D. Foss	17
Robert Denbo	20	Bill Wilson	16
Merritt Hardie	10	Delma Rader	20
Alton Neil, Jr.	14	Wayne Eddingfield	16
Total	77	Total	90
Group Difference in Total Scores is 13			

* These students were absent from school too much during the teaching of this unit to make fair test scores.

TABLE XXII

Comparative Scores Made by the Seventh Grade Pupils on Unit IV
of the Experiment. Unit Subject: Thrift - The Use and
Care of Money.

Textbook Students Group B	Score	Experiment Students Group A	Score
Dorothy DeGarmo	21	Dean Heckel	36
Joe Starke	23	Evelyn McMillan	27
Raye D. Foss	27	Janet Pifer	32
Bill Wilson	20	Robert Denbo	24
Delma Rader	26	Merritt Hardie	30
Wayne Eddingfield	19	Alton Neil, Jr.	15
Total	136	Total	164
Group Difference in Total Scores is 28			

TABLE XXIII

A Table of Comparative Test Scores in Arithmetic Fundamentals for the Seventh and Eighth Grades. The Scores Were Made on the Schorling-Clark-Potter Arithmetic Test, Form A, Before and After the Experiment.

Seventh Grade			Eighth Grade		
Name	Before	After	Name	Before	After
Dorothy DeGarmo	34	31	Carmen Hardie	59	84
Joe Starke	19	24	Bernice Breneman	50	57
Raye D. Foss	34	22	Opal Stimatze	60	69
Bill Wilson	9	9	Betty Jo Cotton	35	40
Delma Rader	35	52	Wanda Lee Kearns	36	56
Wayne Eddingfield	5	15	Kenneth Becker	26	36
Dean Heckel	28	35	Leroy Bartlett	(35)	*
Evelyn McMillan	27	38	June Wilson	53	72
Janet Pifer	19	24	Calvin Fuqua	45	58
Robert Denbo	16	22	Dale Graebner	27	45
Merritt Hardie	19	34	Barbara Holland	43	45
Alton Neil, Jr.	12	19	Lenore Foley	45	53
			Ruth DeBusk	25	50
			Vernie Hall	27	19
Totals	257	325	Totals	531	684

* This pupil was out of school when the test was given after the experiment.

Only pupils who took part in at least three units of work of the experiment are listed in the above table.

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